Chapter 3
Introduction

PURPOSE AND CONTENT

Chapter 3 describes the physical, biological, and human dimension resources of the environment that may be affected by the alternatives presented in Chapter 2, as well as the effects that the alternatives may have on those resources. Affected environment and environmental effects have been combined into one chapter to give the reader a more concise and connected depiction of what the resources are and what may happen to them under the different alternatives. The environmental effects analysis forms the scientific and analytic basis for the comparison of alternatives that appears at the end of Chapter 2.

This introductory section to Chapter 3 is divided into four basic parts:

1. **Ecosystem Management –** presents the ecosystem management framework that was used in the description and analysis of resources and issues in Chapter 3, and introduces the reader to key components and concepts of the framework.

2. **Physical and Biological Setting –** gives a brief overview of the key physical and biological components of the Ecogroup area.

3. **Social and Economic Setting –** gives a brief overview of the key social and economic components of the Ecogroup area.

4. **Chapter Organization –** describes how the affected environment and environmental effects are presented under the issue-related resources of Chapter 3.

ECOSYSTEM MANAGEMENT

In 1992 the Forest Service adopted ecosystem management (EM) as an operating philosophy (Overbay 1992). Ecosystem-based management has been described as “scientifically based land and resource management that integrates ecological capabilities with social values and economic relations to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term” (ICBEMP 1997a). An ecosystem management approach shifts management emphasis from traditional, single resource or species focus to a focus on ecosystems and landscapes. Ecosystem management also strongly considers the interactions between humans and ecosystems.

The Ecogroup Ecosystem Management Framework

For forest plan revision, the Southwest Idaho Ecogroup will consider the components that form the foundation of ecosystem management. The Ecogroup Ecosystem Management Framework borrows from and builds on: (1) the current Forest Plans, (2) The Forest Service Region 4 *Desk Guide, Bridge to Revision* (USDA Forest Service 1993), and (3) *A Framework for Ecosystem Management in the Interior Columbia Basin* (ICBEMP 1996a). The intent of the framework is to integrate ecosystem elements with human needs to strengthen the essential link between economic prosperity, social continuity, and ecosystem processes and functions. We assume that use of the framework will help ensure ecosystem resistance and resilience over time and space. We also recognize that our current understanding of various aspects of the framework may change as new science and information becomes available.

Ecosystem management recognizes that people are part of ecosystems and that collaborative stewardship may be able to address the complexity and controversy inherent in public land management. Furthermore, the framework will use adaptive management to improve our knowledge about environmental effects or the results of management actions, and incorporate this knowledge into future decisions and actions.

Framework Components

The four basic components of ecosystem management are physical, biological, social, and economic, as well as all the diversity and connections contained therein. These components can be further broken down into elements. Examples of these elements include:

- **Physical Diversity** – the elements that comprise the basic building blocks of ecosystems, including geology, landforms, climate, air, water, soil, and hydrologic and soil processes.

- **Biological Diversity –** the elements that comprise life forms that live within ecosystems, including bacteria, fungi, plants, and animals.

- **Social Diversity –** the elements that describe how humans interact with ecosystems and how that interaction influences societies and cultures. These elements include human demographics, social organizations, attitudes, beliefs, values, and lifestyles.

- **Economic Diversity –** the elements that describe how humans generate goods and services from ecosystems and how those products influence economics. These elements include zone of influence, occupational status, economic dependency, and populations.

These components represent the range of resources considered under the ecosystem management framework in this document, and most resources represent some combination of these components. For example, the timber resource manages tree vegetation (biological) to provide goods and jobs (economic) to support local community values and lifestyles (social). The tree vegetation, in turn, depends on productive soils, oxygen, and water (physical) to grow. Indeed, most social and economic resources related to Forest management are heavily dependent on the biophysical resources for long-term sustainability. Put another way, sustainable goods and services are the product of healthy, properly functioning ecosystems. Thus, ecosystem management focuses on maintaining or restoring the biophysical components of ecosystems in order to sustain economic opportunities and support social and cultural values.

Framework Concepts

Some of the important concepts used in ecosystem management, as well as the environmental analysis conducted in this document, are described below.

Scale - Scale is important to understand both in terms of space and time, but it is often difficult and challenging for resource managers to represent and analyze. Relationships viewed on a small scale or over a short time period can be very different when viewed over large scales or for a longer time period. For example, the immediate aftermath of a large fire may appear to be highly destructive, but the same fire viewed in terms of long-term landscape dynamics, may provide many ecological benefits.

Spatial Scale – Spatial scales can be described using a variety of classification systems. We have adapted the National Hierarchical Framework (Bailey 1995) to help describe scales within the ecosystem management framework (Table 3-1). The hierarchical framework is a systematic method for stratifying and classifying land based on combinations of the ecosystem management components. The hierarchy may be used to provide information at appropriate scales for ecosystem mapping, environmental analysis, desired future conditions, and monitoring.

Table 3-1. Hierarchical Relationships Between Scales and Ecosystem Management Components

Traditional Planning Scales	Physical and Biological Components		Social and Economic Components		Typical Issues
	Terrestrial	Aquatic	Social	Economic	
Resource Planning Act	- Division - > 10,000 sq. mi.	Zoogeographic Region	Nation	International Markets	Neo-tropical birds Climate changes
	- Province - 1,000 to 10,000 square miles	River Basin	State	National Markets	- Wide-ranging species (salmon, wolf, lynx...) - Roadless Areas - Wilderness Areas - River Basin Health
Regional Guides	- Section - Subsection - 10 to 1,000 sq. mi.	Subbasin	Zones of Influence	Labor Force Areas	- Biodiversity, Coarse Filter - Subbasin Health - General Fire Management Needs
Forest Plans	- Landtype Associations - 1 to 10 sq. mi.	- Watershed - Subwatershed	Community	County	- Timber Volume - Watershed Health - Biodiversity, Coarse Filter - Vegetation Patterns
- Area Plans - Project Plans	- Landtype - 1 sq. mi. or less	- Subwatershed - Valley Section	Neighborhood	Efficiency Analysis Area	- Biodiversity, Fine Filter - Specific Vegetation Management Design - Soil Compaction

Coarse and Fine Filters – In this document, vegetation is grouped by coarse and fine filters to represent scale. Coarse filter units generally represent ecosystems that are described using a variety of classification systems for vegetation groups, cover types, or communities. Fine filter units are represented by individual species or specific aspects of ecosystems that are uncommon or rare.

Time Scale – Time scales can be used not only to display effects, such as short versus long term, but also to establish reference conditions. Reference conditions are used most often to provide information about pre-settlement conditions. They can therefore establish a context for comparing current and desired conditions. This document uses Historical Range of Variability (HRV) and Properly Functioning Condition (PFC) both as reference conditions against which we compared current conditions, and also as desired conditions for some resources.

Different time scales are also used in the effects analysis to provide a temporal context and comparison for the way conditions may change through time as a result of management activities or natural events. Three general time frames are used: (1) temporary, (2) short-term, and (3) long-term. Unless otherwise stated, temporary effects are generally expected to last anywhere from 0 to 3 years. Short-term effects can include temporary effects but can last up to 10 to 15 years, or the period of time between Forest Plan revisions. Long-term effects generally last longer than 10 to 15 years, or begin to occur after the first 10 to 15 year planning period.

Historical Range of Variability – Over time, ecosystem attributes related to composition, structure and function fluctuate within some range of variability, given a similar set of natural succession and disturbance processes. The term "Historical Range of Variability", or HRV, has been used to describe these fluctuations in attributes, using pre-Euro-American settlement as a reference point (Morgan et al. 1994, Morgan and Parsons 1998). The pre-Euro-American time period is thought to most closely represent the natural cycles, processes, and disturbances under which ecosystems evolved.

Ecosystems operating within the HRV are considered to be more resistant and resilient to disturbances, and therefore the effects of disturbances are more predictable. Conversely, ecosystems operating outside of the HRV tend to be affected by disturbances in ways that are much different than those conditions under which plants soils, animals, and other ecosystem elements evolved. Disturbance effects become much less predictable, and the risk of losing resiliency and compositional, structural, and functional elements of ecosystems increases.

Properly Functioning Condition – Ecosystems are in Properly Functioning Condition (PFC) when they are dynamic and resilient to disturbances that can affect their biological and physical components (USDA Forest Service 1996). PFC is not an end-point but rather represents a range of conditions based largely on HRV and biological and physical potential. PFC can be assessed using a process that compares the current condition of "subject areas" against an established range of PFC. Criteria representing attributes and processes are used to describe PFC. Subject areas are assessed to be either within PFC or outside of PFC and therefore at some relative degree (low, moderate, high) of departure and risk. Departure and risk are based on the ability of an ecosystem to maintain key attributes or processes, and to return to or move toward PFC after disturbance. Subject areas that are highly departed from PFC are at high risk of losing critical attributes or processes to disturbances such as fire, insects, disease, compaction, and competition, and will likely have a much more difficult time moving toward PFC following disturbance than those areas assessed to be at lower risk.

As part of the revision process, the Ecogroup Forests developed criteria for, and conducted PFC assessments on 27 different subject areas in order to better understand the current condition of resources. The assessments were initially conducted at the landscape scale, looking at subbasins or groups of subbasins, and then the information was "stepped down" to the Management Area scale. District specialists familiar with the assessment areas evaluated the subject areas.

Desired Conditions – Desired conditions for most biophysical resources of the Ecogroup Forests were developed using HRV and PFC as a foundation or starting point. However, these desired conditions were often tempered by the desired conditions of the social and economic resources, and by the fact that HRV or PFC may never be fully attained in some instances.

A good example of this compromise is the influence of Forest roads. Roads have indisputable impacts on biophysical resources, and the Forests can reduce those impacts by reducing the amount of roads and improving existing roads. However, current conditions will never fully simulate pre-road historical conditions, because that goal is neither desirable nor achievable from a social or economic perspective. People desire and demand access to their public lands. Consequently, the desired condition attempts to balance ecosystem management components by providing and improving road access, while reducing road-related concerns to other resources where necessary. Management actions to address these concerns may include decommissioning roads that are not needed for the long-term transportation system, closing roads seasonally to reduce wildlife vulnerability, replacing culverts to enhance fish passage, or improving road surfaces and drainage to reduce impacts to soil and water and increase user safety and comfort.

Other changes to the historical landscape—such as recreational facilities, non-native plants, fire exclusion, timber harvest, water impoundments, and livestock grazing—have also created conditions such that HRV or PFC may be impossible to achieve in the short or long term. The desired conditions developed for the Ecogroup recognize and incorporate these circumstances, while operating on the principle that the closer we can approach HRV or PFC for biophysical resources, the better those resources will be able to provide for sustainable, diverse, and functional ecosystems. And those ecosystems, in turn, will be able to provide sustainable goods, experiences, and opportunities for the diverse needs and desires of people.

Ecological Disturbances - Weather, fire, insects, disease, floods, and other natural and human-induced disturbance agents can affect ecosystems. Typically, these agents alter ecosystem attributes related to composition, structure, and function. Timber harvest, for instance, can change large tree structure to openings or young forest, and thereby change the habitat for terrestrial species that live in the area. Floods can change the structure of stream channels and the structure and composition of riparian habitat. The variety of organisms or conditions found across the landscape is related in part to the extent, timing, and severity of these disturbances. Historically, the disturbance agent that has had the most impacts on vegetation patterns and distribution across the Ecogroup landscapes is fire.

Fire – Ecosystems in the Ecogroup have evolved with fire, and many species have developed adaptations that allow them to persist in communities over time in the presence of fire. Historically, fire was a primary disturbance that altered or controlled vegetative composition, density, and vertical structure, particularly in warmer, drier environments (Agee 1990, Steele et al. 1986, Daigle 1996, Barrett et al. 1997). Fire affected all vegetative layers, including trees, shrubs, forbs, and grasses. Fire affected litter, duff, and coarse wood development, created snags, and helped recycle organic debris. In colder, moister environments, fire primarily influenced vegetation development, patterns, and distribution.

Fire Regimes – Fire regimes describe the type of fire that generally occurs in an ecosystem. The common fire regimes for the Ecogroup are summarized in Table 3-2. More detailed descriptions of each regime can be found in the *Fire Management* section in this chapter.

Table 3-2. Ecogroup Fire Regimes

Regime	Fire Interval	Fire Intensity	Vegetation Patterns (from Agee 1998)
Non-lethal	5 – 25 years	10 percent or less mortality	Relatively homogeneous with small patches generally less than 1 acre of different seral stages, densities, and compositions created from mortality.
Mixed1	5 – 70 years	10 – 50 percent mortality	Relatively homogeneous with patches created from mortality ranging in size from less than 1 to 600 acres of different seral stages, densities, and compositions.
Mixed 2	70 – 300 years	50 – 90 percent mortality	Relatively diverse with patches created by mixes of mortality and unburned or underburned areas ranging in size from less than 1 to 25,000 acres of different seral stages, densities, and compositions.
Lethal	100 – 400 years	90+ percent mortality	Relatively homogeneous with patches sometimes greater than 25,000 acres of similar seral stages, densities, and compositions. Small inclusions of different seral stages, densities, and compositions often result from unburned or underburned areas.

For some vegetation groups in the Ecogroup, particularly the warmer and drier groups, fire regimes have shifted rather dramatically from what they were historically. This shift has generally been from non-lethal and mixed1 regimes to mixed2 and lethal regimes, and is primarily due to an increase in fuel loadings, stand densities, and climax species associated with fire exclusion. This shift is reflected in the current vegetative conditions and hazards, and has management implications that are analyzed by alternative in this chapter.

Biodiversity - As noted in Chapter 1, a number of concerns related to biodiversity were identified in the *Preliminary AMS Summary* (USDA Forest Service 1997). Because biodiversity basically encompasses all of life and its interconnections, the revision team chose not to address this topic in this EIS as a separate resource or issue; but rather present current conditions and analyze effects on key components of biodiversity throughout the resource sections of Chapter 3.

PHYSICAL AND BIOLOGICAL SETTING

Issues related to biophysical resources are analyzed in detail in this chapter. These resources include Air, Soils, Water, Riparian, Aquatic Habitat and Species, Terrestrial Habitat and Species, Vegetation Diversity, Vegetation Hazard, Botanical Resources, Non-native Plants, and Fire. A more general description of the biophysical setting for the Ecogroup appears below.

Climate

Climate within the Ecogroup strongly influences human uses and resources, and ecological processes such as biological productivity, fire regimes, soil erosion, and stream flow. The Ecogroup area located north and east of the Snake River lies within the "Northern Rockies" transitional climate zone. The "Snake River Plateaus" continental climatic zone encompasses the rest of the Ecogroup located in southern Idaho and northern Utah.

Northern Rockies

Climate patterns are typically moist and cold in the winter and early spring, and warm to hot and dry during the summer and early fall. The winter climate is influenced by mountain ranges that block most arctic air from entering the Ecogroup. The Snake River and Salmon River valleys, however, can funnel dry arctic air into the basin where it often stagnates. In the late spring and summer, moisture from the Gulf of Mexico may move north and combine with warm temperatures and steep topography to produce brief but high-intensity thunderstorms. Late spring events generally have more precipitation, with 24-hour accumulations often greater than one inch. Dry lightning is more common during summer and fall.

Winter temperatures average between 29 and 9 degrees Fahrenheit. Snowfall ranges from about 55 to 70 inches, with greater amounts at higher elevations. Despite cold winter temperatures, occasional marine intrusions enter the area, with rainfall occurring mainly at elevations below 5,000 feet. These intrusions can produce rain-on-snow events that can trigger floods and landslides. Increased exposure to the maritime air masses creates moister vegetation regimes as one moves progressively north within the area. Average summer temperatures can reach over 100 degrees in lower elevations, with higher elevations in the 80s to 90s. Growing seasons vary greatly, from less than 30 days in the highest alpine areas to over 150 days in the lower valleys.

Snake River Plateaus

Climate patterns are influenced by a variety of climatic zones. This area is influenced by mountain ranges that block arctic air from entering the Ecogroup area. However, artic air can spill over from the Northern Rockies east of this area, and winter inversions may trap this cold air for extended time periods. In the late spring and summer, moisture from the Gulf of Mexico may move north into this area and combine with warm temperatures and steep topography to increase brief but high-intensity thunderstorms. Also, hot unstable air from the Great Salt Lake region can increase thunderstorm and lightning development over the upper plateaus. Dry lightning is common during summer and early fall.

This is the driest part of the Ecogroup and supports various high desert landscapes. This area does not have the same susceptibility to marine intrusions as the northern Rockies. Although rain-on-snow floods are rare in this region, when they occur they are more destructive and of greater magnitude than spring floods. Winter temperatures average between 31 and 12 degrees. Seasonal snowfall typically ranges from 16 to 50 inches. Average summer temperatures generally reach the mid 90s at lower elevations, with the higher elevations in the mid 80s to 90. Growing seasons vary greatly, from less than 50 days in high sub-alpine areas to over 120 days in lower valleys and hill slopes.

Geology and Topography

Elevations vary greatly across the Ecogroup, from 1,600 feet in the Snake River Canyon to over 12,000 feet atop Hyndman Peak east of Sun Valley. This wide range of elevations encompasses a great diversity of geology, flora, and fauna. At least six major landforms have resulted from past geomorphic processes:

- High-elevation distinctive mountains and valley formed from alpine glaciation,
- More subtle high-elevation topography formed by freezing and thawing processes,
- Lands with sharply defined drainage patterns formed by stream-cutting action,
- Depositional lands formed from eroded materials from higher lands,
- Lands formed by volcanic flows,
- High-elevation desert plateaus featuring rolling hills, arid plains, and intermittent mountain ranges.

Geologically, the large northern section of the Ecogroup is dominated by Columbia River basalts to the west, Idaho Batholith granitics in the middle, and Challis volcanics to the east. Major mountain systems include the Sawtooth and Boise Ranges, and portions of the Boulder, Pioneer, Salmon River, and Seven Devils Ranges. Much of the area lies within the Idaho Batholith, the largest contiguous batholith in the United States. The batholith features steep slopes of coarse-textured soils that readily take in and transmit water. Unless these soils are disturbed, surface runoff is rare except during high-intensity storms or rain-on-snow events.

The smaller, southern section of the Ecogroup is a series of high-elevation islands of complex geology located within the dry plains of the Columbia Plateau and Basin and Range Provinces. Mountain ranges here include Albion, Black Pine, and Raft River.

For the purposes of effects analysis and management considerations, the Ecogroup has been broken out into groupings of landtype associations that feature similar geology and topography. These groupings are listed and described in Soil and Water Technical Report.

Water

Watersheds on the Ecogroup provide a continuous supply of water to the Snake and Salmon River Basins. The water resource has many beneficial uses, including aquatic habitat, recreation, irrigation, hydropower, and domestic water supply. The Ecogroup has almost 25,000 miles of stream, and 28,000 acres of lakes and reservoirs, and contains important portions of the Snake, Salmon, Payette, Boise, Big Wood, and Weiser River systems.

For the purposes of effects analysis and management considerations, the Ecogroup has been broken out into groupings of subbasins, watersheds, and subwatersheds that follow the national system for watershed delineation. These are listed and described in the Soil and Water Technical Report.

Vegetation

The wide range of landforms, elevation, and climate across the Ecogroup has produced a wide variety of vegetative conditions. About 70 percent of the Ecogroup lands are considered forested, or capable of supporting trees. Common tree species include ponderosa pine, Douglas-fir, aspen, lodgepole pine, subalpine fir, Engelmann spruce, and whitebark pine. Grand fir and western larch only grow in the northwestern portion of the Ecogroup where conditions are somewhat moister, and pinyon and juniper are limited to the drier, southern end of the Ecogroup. An estimated 28 percent of the Ecogroup is considered non-forested, or dominated by grass, forb, or shrub species. Much of the non-forested vegetation is found at low elevation, on dry southern aspects, or in high-elevation alpine settings.

For the purposes of effects analysis and management considerations, the Ecogroup has been broken out into forested, woodland, shrubland, grassland, and riparian vegetation groups. These general groups are described in the *Vegetation Diversity* section of Chapter 3. The main components of the groups are described in detail in *Appendix A* of the Forest Plans, and in the Vegetation Technical Report.

Terrestrial and Aquatic Species

The Ecogroup area provides habitat for over 300 terrestrial and aquatic species. Elk and deer are the most common large animals, although moose, mountain goat, bighorn sheep, black bear, and cougar are also present. Gray wolves have been recently re-introduced and populations are currently expanding. Other wide-ranging carnivores include wolverine, lynx, and fisher. Bird species include bald eagle, peregrine falcon, great gray owl, northern goshawk, sage grouse, and many migratory land birds.

An estimated 50 species of fish are found in Ecogroup streams and lakes, including about 20 species that have been introduced or moved to areas where they are not native. Native species include anadromous sockeye salmon, currently listed as endangered under the Endangered Species Act, and chinook salmon, steelhead trout, and bull trout, which are currently listed as threatened. Other native species of special concern include westslope cutthroat, Yellowstone cutthroat trout, and Wood River sculpin.

SOCIAL AND ECONOMIC SETTING

Issues related to socio-economic resources are analyzed in detail in this chapter. These resources include Recreation, Scenic Environment, Roads, Roadless Areas, Wilderness, Wild and Scenic Rivers, Tribal Interests and Rights, Timber, and Range. The social and economic effects of these resources are also analyzed on local counties and communities. A more general description of the social and economic setting for the Ecogroup appears below.

Counties and Communities

For analysis purposes, the socio-economic Zone Of Influence (ZOI) for the Ecogroup includes 17 counties and 19 communities in southwestern and south-central Idaho. The 17 counties are Ada, Adams, Blaine, Boise, Camas, Canyon, Cassia, Custer, Elmore, Gem, Gooding, Idaho, Lincoln, Power, Twin Falls, Valley, and Washington. The 19 communities are Cascade, Challis, Council, Crouch/Garden Valley, Emmett, Fairfield, Gooding, Hailey/Bellevue, Idaho City, Ketchum/Sun Valley, McCall/Donnelly, New Meadows, Oakley Valley (Oakley), Raft River Valley (Almo-Malta-Elba), Riggins, Stanley, Treasure Valley (including but not limited to Boise, Eagle, Meridian, Kuna, Nampa and Caldwell), Twin Falls, and Weiser.

For analysis purposes, these counties and communities have been grouped into three categories: urban, urban-adjacent, and rural. Urban counties and communities have little if any Forest System lands, have diversified economies, and are not very dependent on Forest resources. However, urban populations do use the Forests, and they are they are both interested in, and exert a strong influence on, Forest lands and their management. Urban-adjacent counties and communities are those located near or strongly influenced by urban centers. Because many inhabitants are commuters, second-home owners, or retirees, these areas tend not to be heavily dependent on Forest resources, although the counties contain a substantial amount of Forest System lands, and interest in Forest management is high. Rural counties and communities tend to be much more dependent on Forest resources, and therefore Forest management decisions and actions can have substantial social and economic effects.

The populations of the urban and urban-adjacent areas have been growing rapidly and are predicted to continue this growth pattern through the next planning period. Rural areas, on the other hand, have been fairly static, and populations are predicted to remain so or increase at a much slower rate. The social and economic analysis will look at potential effects from the alternatives on populations, community employment and income, lifestyles, land use patterns, social organization, and attitudes, beliefs, and values.

American Indian Tribes

Although no American Indian reservations are located within the Ecogroup area or the Ecogroup’s economic zone of influence, the Nez Perce, Shoshone-Bannock, and Shoshone-Paiute Indian Tribes have off-reservation treaty rights to hunt, fish, and gather on certain federal lands, including the Ecogroup National Forests.

A primary concern of these tribes is the availability and sustainability of resources (plant, animal, fish) that they have traditionally hunted or gathered on what are now National Forest System lands. The issue is the availability of resources in sufficient quantities to allow harvest to satisfy the ceremonial, subsistence, and traditional needs of the tribes, while still providing for the conservation needs of the species.

CHAPTER ORGANIZATION

The remainder of Chapter 3 is organized by resource, focusing on those resources that are related to major issues described in Chapter 1. The resources and issues are presented in a manner that essentially follows the ecosystem management framework, starting with physical and biological components and moving into social and economic components. Each resource section is organized and presented in the format described below. The first three elements of this format define the affected environment, and the last three elements define the environmental consequences.

Affected Environment

Issues and Indicators – This section is divided into three parts for each resource-related issue: (1) a brief issue statement, (2) a background section that describes the origin and various aspects of the issue in detail, and (3) the indicators used to measure effects from the alternatives on the issue.

Affected Area – Briefly describes the geographic area or areas affected for the resource-related issues. Areas may differ for direct, indirect, and cumulative effects. Affected areas may also vary in size depending on the resource, issue, or anticipated activities.

Current Conditions – Describes the current conditions of the resources related to the issues and indicators. This section may also include history, development, past disturbances, natural events, and interactions that have helped shape the current conditions.

Environmental Consequences

Effects Common to All Alternatives – Describes the general type of effects that may occur to the resource from implementation of the alternatives, including any mitigating effects from Resource Protection Methods.

Direct and Indirect Effects – Analyzes the amount and intensity of direct and indirect effects by alternative on the resource-related issues and indicators. Direct effects are caused by an action and occur at the same time and place as that action. Indirect effects are caused by an action but occur later in time or farther removed in distance. This section also looks at the relationship of temporary (1-3 years), short-term (3-10 years), and long-term (>10 years) effects.

Cumulative Effects – Analyzes the cumulative effects to the resource that may result from the incremental impacts of the alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions (40 CFR 1508.7 and .8).

Analysis Calculations

In the modeling and analysis included throughout Chapter 3, the numbers for Management Prescription Categories, road miles, acres of timber harvest, etc. are all best estimates based on the latest available information. The modeling and analysis conducted for this EIS are intended and designed to indicate relative differences between the alternatives, rather than to predict absolute amounts of activities, outputs, or effects.

MPC-based Analysis

The Forest Plans and the EIS alternatives do not authorize implementation of management activities described in the effects analyses. The Forest Plans set the stage for what future management actions are needed to achieve desired outcomes (desired conditions, goals, and objectives), and they provide the sideboards (standards and guidelines) under which future activities will operate in order to manage risks to biophysical resources and the social and economic environments.

To actually implement site-specific projects, project-level planning, environmental analysis, and decisions must occur. For instance, the Forest Plans may contain direction to close or obliterate roads in order to benefit biophysical resources and to increase management efficiency, but a site-specific analysis and decision must be made for each proposal that involves any specific road closures or obliteration. This process is referred to as "staged decision-making" because a series of decisions are necessary to carry out projects as site-specific needs, priorities, locations, conditions, and public concerns become evident.

Each EIS alternative provides a different mix of management prescriptions (MPCs). The mix of management prescriptions (MPCs) provides an indication of the management goals (i.e., desired outcomes) that subsequent site-specific projects would strive to meet or move toward. Thus, the mix of MPCs allocated under each alternative is often used in the EIS effects analyses as a means to differentiate between and compare alternatives. The MPC-based effects analyses compare potential effects from various management activities that could occur under various combinations of MPCs represented by the alternatives. These effects are modeled based on assumptions about the type, amount, and intensity of management activities that would be allowed or emphasized under each MPC. As stated above, the modeled effects in the EIS are designed to show relative differences in alternatives—not to accurately predict the amount or location of management activities that would occur during the planning period should that alternative be selected for implementation.

Air Quality and Smoke Management

INTRODUCTION

The Southwest Idaho Ecogroup can summon images of cool clear streams, forested mountains, birds, wildlife, or perhaps a special place that has a spectacular view of distant mountainous ridges or deep valleys. Viewing scenery is one of the most often-cited reasons for visiting national forests (USDA Forest Service 1996). Good air quality has increasingly become a public priority, and national forests are usually seen as having a positive effect on air quality. At the same time, forest ecologists have identified a need to return fire to its historical role in the ecosystem as an important ecological process (Morgan et al. 1994). Prescribed fire and wildland fire use (for resource benefit) can accomplish a variety of management objectives. However, there is concern that an increase in fire use may adversely affect air quality through the release of pollutants. Therefore, appropriate management direction is needed to minimize or resolve conflicts between managing the Forests using fire and maintaining and improving air quality for public health and visibility.

Regulatory Framework

Federal Clean Air Act

Air quality is protected under the Clean Air Act (CAA) passed by Congress in 1955 and amended in 1967, 1970, 1977, and 1990. The CAA has served as the primary legal instrument for air resource management. It requires the Environmental Protection Agency (EPA) to, among other things, identify and publish a list of common air pollutants that could have an impact on public health or welfare. These are referred to as "criteria pollutants". Criteria pollutants are sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide, and particulate matter. Particulate matter has two standards, one for coarse particulates (PM 10) and one for finer particulates (PM 2.5). PM 10 stands for particulate matter less than 10 micrometers in aerodynamic diameter, which is equivalent to 1/25,000th of an inch. PM 2.5 stands for particulate matter less than 2.5 micrometers in aerodynamic diameter, which is one-quarter the size of PM 10. Finer particulate matter (PM 2.5) makes up about 85 percent of the coarse particulate matter (PM 10).

Public Health--The EPA and states designate concentration levels for the criteria pollutants to protect public health. Federally designated maximum concentration levels are called National Ambient Air Quality Standards (NAAQS) and are defined as the amount of pollutant above which detrimental effects to public health (or welfare) may result (Table AQ-1). NAAQS are set at a conservative level with the intent of protecting even the most sensitive members of the public including children, asthmatics, and people with cardiovascular disease. If an area violates the NAAQS, that area becomes federally designated as a "non-attainment" area. An area that was one time in non-attainment, but has since met the NAAQS and other requirements, is called a maintenance area.

Table AQ-1. National and State Ambient Air Quality Standards

Pollutant	Time Period Average	Federal	Idaho and Utah
Carbon Monoxide (CO)	One hour 8 hour	35 [1]ppm 9 ppm	35 ppm 9 ppm
Lead (Pb)	Calendar Quarter 90-day	1.5 [2]$\mu g/m^3$ --	1.5 $\mu g/m^3$
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean Hourly Average	0.053 ppm -------------	0.053 ppm -------------
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean 24-hour 3-hour Hourly Average	0.03 ppm 0.14 ppm 0.50 ppm -------------	0.03 ppm 0.14 ppm 0.50 ppm ------------
Ozone	8 hour Hourly Average	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm
PM 10	Annual Arithmetic Mean 24-hour	50 $\mu g/m^3$ 150 $\mu g/m^3$	50 $\mu g/m^3$ 150 $\mu g/m^3$
PM 2.5	Annual Arithmetic Mean 24-hour	15 $\mu g/m^3$ 65 $\mu g/m^3$	*------- -------

[1]ppm=parts per million
[2]micrograms per cubic meter
*As of November 2002, Idaho and Utah had not adopted PM 2.5 standards different than the federal standard.

Criteria pollutants such as sulfur dioxide and nitrogen dioxide are of concern because of their potential to cause adverse effects on plant life, water quality, aquatic species, and visibility. However, sources of these pollutants are generally associated with urbanization and industrialization rather than with natural resource management activities or wildfire. Wildfire and natural resource management activities such as timber harvest, road construction, site preparation, mining, and fire use can generate ozone, carbon monoxide, and particulate matter. While ozone is a byproduct of fire, potential ozone exposures are infrequent (Sandberg and Dost 1990). Carbon monoxide is rapidly diluted at short distances from a burning area, as fires are generally spatially and temporally dispersed, and pose little or no risk to public health (Sandberg and Dost 1990). The pollutant of most concern to public health and visibility within and downwind of the Ecogroup area is particulate matter. Even though particulate matter has no serious effects on ecosystems because fire and smoke are an ecological process (ICBEMP 2000a), it does affect human health, and visibility. Because of its smaller size, PM 2.5 poses greater health risks than PM 10. Large volumes of particulate matter can be produced from fire and, depending on meteorological conditions, may affect large areas for extended periods of time.

Each day, concentrations of various air pollutants are measured in areas across the States. After the amount of pollution is measured, it is compared to the federal standard. To make it easy to compare all the different pollutants and determine the air quality, the EPA (US EPA June 2000) developed the Air Quality Index (AQI) to relate all criteria pollutants to the same scale. Table AQ-2 displays the 24-hour AQI breakpoints for PM 10 and PM 2.5. When concentrations reach "Unhealthy for Sensitive Groups", cautionary statements are issued to suggest that people with respiratory conditions or heart disease, the elderly and children, and those who work, exercise, or spend time outdoors, should limit prolonged exertion.

Table AQ-2. Air Quality Index (AQI) and Particulate Matter (PM) 10 and 2.5 Breakpoints

AQI Value	Health Concern	PM 10 Breakpoints [1]$\mu g/m^3$	PM 2.5 Breakpoints $\mu g/m^3$
0 – 50	Good	0 – 54	0 – 15.4
51 – 100	Moderate	55 – 154	15.5 – 40.4
101 – 150	Unhealthy for Sensitive Groups	155 – 254	40.5 – 65.4
151 – 200	Unhealthy	255 – 354	65.5 – 150.4
201 – 400	Very Unhealthy	355 – 424	150.5 – 250.4
> 400	Hazardous	> 424	> 250.5

[1]micrograms per cubic meter

While the NAAQS evaluate smoke impacts related to public health, smoke often causes public concern at levels below the NAAQS. One study compared the number of complaints about smoke to the measured PM 10 concentrations (Acheson et al. 2000). Complaints increased when PM 10 concentrations were as low as 30 micrograms per cubic meter. The 24-hour threshold for the PM 10 NAAQS is 150 micrograms per cubic meter (Table AQ-1). The Air Quality Index for a concentration of 30 micrograms per cubic meter would be rated as “Good” indicating no health concerns (Table AQ-2).

Visibility Impairment (Mandatory Class I Areas) – Class I areas are set aside under the Clean Air Act to receive stringent protection from air quality degradation. Mandatory Class I areas are those with certain Federal designations in existence prior to the 1977 amendments to the Clean Air Act. These include 1) international parks, 2) national wilderness areas that exceed 5,000 acres in size, 3) national memorial parks that exceed 5,000 acres in size, and 4) national parks that exceed 6,000 acres in size.

The 1977 amendments to the Clean Air Act established a national goal of “the prevention of any future, and the remedying of any existing impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution”. Fine particles (PM 2.5) are the primary cause of visibility impairment in Class I areas although gases also contribute. Visual range is one indicator of pollution concentrations in the air. Visibility variation occurs as a result of the scattering and absorption of light by particles and gases in the atmosphere. Without pollution effects, an estimated natural visual range is 90 miles in the eastern U.S. and up to 140 miles in the western U.S. (US EPA November 2001).

In 1980 EPA’s visibility regulations were developed to protect mandatory Class I areas from human-caused impairments reasonably attributable to a single or small group of sources. In contrast, EPA proposed in 1997 a new regulatory program to protect mandatory Class I areas from visibility impairment produced by a multitude of sources that emit fine particles and their precursors across a broad geographic area. This Regional Haze Rule (40 CFR, Part 51), addresses impacts from numerous and broad based sources that cannot be easily pinpointed. The rule calls for states to establish goals for improving visibility in mandatory Class I areas and to develop long-term strategies for reducing emission of air pollutants that cause visibility impairment. Fire use is one of the sources addressed by the regulations. Idaho and Utah are in the preliminary stages of developing State Implementation Plans for regional haze and the Forest Service will be actively involved with the states as they develop their implementation plans.

Interim Air Quality Policy on Wildland and Prescribed Fires

On May 15, 1998, the EPA issued the *Interim Air Quality Policy on Wildland and Prescribed Fires* (referred to as the *Interim Policy*) to address impacts to public health and welfare. This policy was prepared in response to anticipated increases in fire use that were expected to occur as a result of implementing the *1995 Fire Management and Policy Review*, which outlined a need to restore fire as an ecosystem process into many wildlands. The *Interim Policy* was prepared in an effort to integrate the goals of allowing fire to function in its ecological role for maintaining healthy ecosystems balanced with protecting public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility. The policy was developed with the active involvement of stakeholders including the U.S. Department of Agriculture. The *Interim Policy* is Federal policy that reconciles the competing needs to use fire and maintain clean air to protect public health. The *Interim Policy* is interim only because it does not yet address agricultural burning or regional haze (US EPA 1998). It is not interim with regard to how States, Tribes, and Federal land managers are expected to address smoke from prescribed fires.

The *Interim Policy* suggests that air quality and visibility impact evaluations of fire activities on Federal lands should consider several different items during planning (US EPA 1998). We considered, and addressed to the extent practical, those appropriate for a programmatic scale evaluation. Items discussed in detail in this EIS include a description of applicable regulations, plans, or policies, identification of sensitive areas (receptors), and the potential for smoke intrusions in those sensitive areas. Other important considerations also discussed are applicable smoke management techniques, participation in a basic smoke management program, and potential for emission reductions. Two *Interim Policy* planning items mentioned below in this section will not be explained to the same level of detail as those listed above. These include ambient air quality and visibility monitoring plans, and the cumulative impacts of fires on regional and subregional air quality. In addition to these listed items, issues regarding public (transportation) safety are also discussed.

Ambient Air Quality and Visibility Monitoring - The State of Idaho has one of the best ambient air monitoring networks in the nation. The Idaho Department of Environmental Quality (IDEQ) has recently developed a statewide monitoring network for PM 2.5. In addition, an expansion of the Interagency Monitoring of Protected Visual Environments (IMPROVE) network, which monitors effects to visibility in Class I areas, is underway through cooperative efforts of EPA, state regulatory agencies, and federal land managers. Objectives of this monitoring are to establish current conditions, to track progress toward the national visibility goal by documenting long-term trends, and to determine the types of pollutants and sources primarily responsible for visibility impairments (US EPA March 2001). The IMPROVE network has been undergoing expansion since 2000 to add to the number of sites that have modules to determine types of pollutants causing or contributing to visibility impairment.

Regional and Subregional Air Quality - Only a few analyses have been conducted at a regional scale or provide a mechanism to evaluate cumulative impacts to air quality that are applicable to the Southwest Idaho Ecogroup. The Interior Columbia Basin Ecosystem Management Project

(ICBEMP) estimated the potential for air pollution from industrial sources to reach Class I wilderness areas in the Pacific Northwest (Ferguson and Rorig in press). The ICBEMP area includes the Ecogroup Forests. The Regional Pollution Potential is based on monthly averaged emission concentrations from industrial stacks, winds at different elevations, and mixing heights. Pollution trajectories were plotted by vertical level, per pollutant parameter, per season. Climate information, including mixing heights, and upper level and surface trajectory winds was also developed as part of the ICBEMP assessment (Ferguson 1998).

Smoke Management Program – The *Interim Policy* calls on states (and tribes) to develop smoke management programs and for federal land managers to participate in them. Basic elements of a smoke management program include 1) a process to authorize burns; 2) a requirement that land managers consider alternatives to burning to reduce air pollutant emissions; 3) a requirement that burn plans include smoke management components such as actions to minimize fire emissions; evaluation of smoke dispersion; actions that will be taken to notify populations and authorities prior to burns to reduce the exposure of people in sensitive areas if smoke intrusions occur; and air quality monitoring especially in sensitive areas; 4) a public education and awareness program; 5) a surveillance and enforcement program; and 6) periodic review of its program for effectiveness. In exchange for states (and tribes) proactively implementing smoke management programs, EPA intends to exercise its discretion not to re-designate an area as non-attainment if convincing evidence shows that fire use caused or contributed to violation of the daily or annual PM 10 or PM 2.5 standards. The state (or tribe) must certify to EPA that at least a basic program has been adapted and implemented. The Montana/Idaho Airshed Group operates Idaho's smoke management program. This group is composed of members that include federal, tribal, state, and local governments and forest products companies who conduct the majority of the forestry or rangeland prescribed burning in the state. It also includes the health agencies that regulate this burning. Members belonging to the Group agree to 1) a smoke management plan for reporting and coordinating burning operations on all forest and rangelands; 2) develop alternative methods to open burning when possible; 3) review and evaluate the program at the end of each burning season in order to improve the smoke management plan where feasible. The State of Idaho has certified to EPA that the operations of the Montana/Idaho Airshed Group meet the requirements of a basic smoke management program. Utah's smoke management program is similar to that of the Montana/Idaho Airshed Group and has been certified to EPA. These coordinated burning operations provide an essential tool for minimizing smoke impacts.

Alternatives To Burning And Emission Reductions - Even though the *Interim Policy* acknowledges that fire is a necessary and non-replaceable treatment to meet certain objectives, land management agencies are encouraged to consider whether there are alternatives to burning in order to reduce emissions. In general, mechanical treatments are considered the most viable means of reducing emissions though in some ecosystems chemicals may be an option. However, the *Interim Policy* also acknowledges that considering alternatives to burning is not without tradeoffs and limitations. The policy states that mechanical opportunities are most normally limited to:

- Accessible areas (those with roads, harvest systems, etc)
- Terrain that is not excessively rough

- Slopes equal to or less than 40 percent
- Areas not designated as National Parks or Wilderness
- Areas without listed species
- Areas without cultural or paleological resources.

In addition to the items listed above, Forest Plan direction including land allocations, desired conditions, goals, objectives, standards, and guides may also limit opportunities for mechanical treatments.

Global Climate Change

Global climate change is a natural and human-driven process. Ecosystems have evolved across the landscape in part in response to changes in climate. Humans affect changes in ecosystems by modifying landscapes and emitting gases and particles into the atmosphere. Management decisions on national forest systems lands can affect global climate because significant change can occur as an accumulation of many smaller changes. However, Global Climate Change and carbon sequestration are beyond the scope of this analysis and scale of decisions made in a Forest Plant. Global Climate Change is addressed as part of the Forest and Rangeland Renewable Resources Planning Act (RPA) Assessment and in the Forest Service Strategic Plan prepared in response to the Government Performance and Results Act (GPRA).

Issue and Indicators

Issue Statement: Forest Plan management strategies may affect air quality based on the amount of smoke produced by fire use and wildfire.

Background to Issue: Need for Change related to air quality and smoke was identified in the *Preliminary AMS for the Southwest Idaho Ecogroup Summary* (USDA Forest Service 1997) and is summarized here. Identified were concerns that the role of fire as an ecological process was not fully considered during the development and analysis of the existing Forest Plans. In addition, the use of fire as a management tool was described for some resources; however fire over large areas was not considered. The potential impacts on other resources including air quality from fire use and wildfire were not analyzed. Finally, there is a need to incorporate consistent air quality and smoke management direction, desired conditions, and monitoring plans into the revised Forest Plans based on new air quality requirements at the federal, state, and local levels, including new Forest Service direction.

Since the original forest plans were developed, resource managers have recognized the importance of fire as an ecological process in the maintenance of sustainable ecosystems. Forest plan revision offers the opportunity to define and resolve issues that involve fire use, its relationship to vegetative conditions, and its environmental impacts and benefits on air resources.

Indicators: Estimated smoke emissions were used as an indicator of effects to air quality by comparing emissions for alternatives to historical (pre-settlement) emissions by Forest or Administrative Unit. This includes emissions generated from fire use or wildfire in forested and non-forested vegetative communities. The comparison units were derived from estimates of PM 10. PM 2.5 emissions were derived from the PM 10 estimates assuming approximately 85 percent of the coarse particulate matter (10) is made up of fine particulate matter (2.5) (Reinhardt et al. 1997). However, in all cases the amount of emissions estimated for an area indicates only the risk of an effect on ambient air concentrations. Whether or not the emissions actually produced from any one alternative would violate NAAQS for any one area cannot be determined at this scale.

Historical emissions were estimated based on the number of acres that may have burned under historical fire regimes (see the *Fire Management* section) to provide a consistent context for comparing amounts from various sources. Fire use emissions were based on the outcomes of acres treated from SPECTRUM (for the forested vegetation) and VDDT (for the non-forested vegetation) models (see *Appendix B* for more details regarding the modeling). These models estimated the number of acres treated with fire or mechanically to achieve desired vegetative conditions. Emissions estimated from mechanically treated acres were used to represent activity fuel treatments. Acres potentially burned by wildfire for the forested vegetation were derived from uncharacteristic wildfire hazard ratings and represent the emissions that could be produced from uncharacteristic wildfire. In addition, the wildfire emissions for forested vegetation include the "background wildfire" acres estimated directly from SPECTRUM (see the *Vegetation Hazard* section for an explanation of uncharacteristic wildfire hazard and background wildfire). For the non-forested vegetation, acres of failed fire suppression and background wildfire were used to estimate potential wildfire emissions (see the *Vegetation Hazard* section).

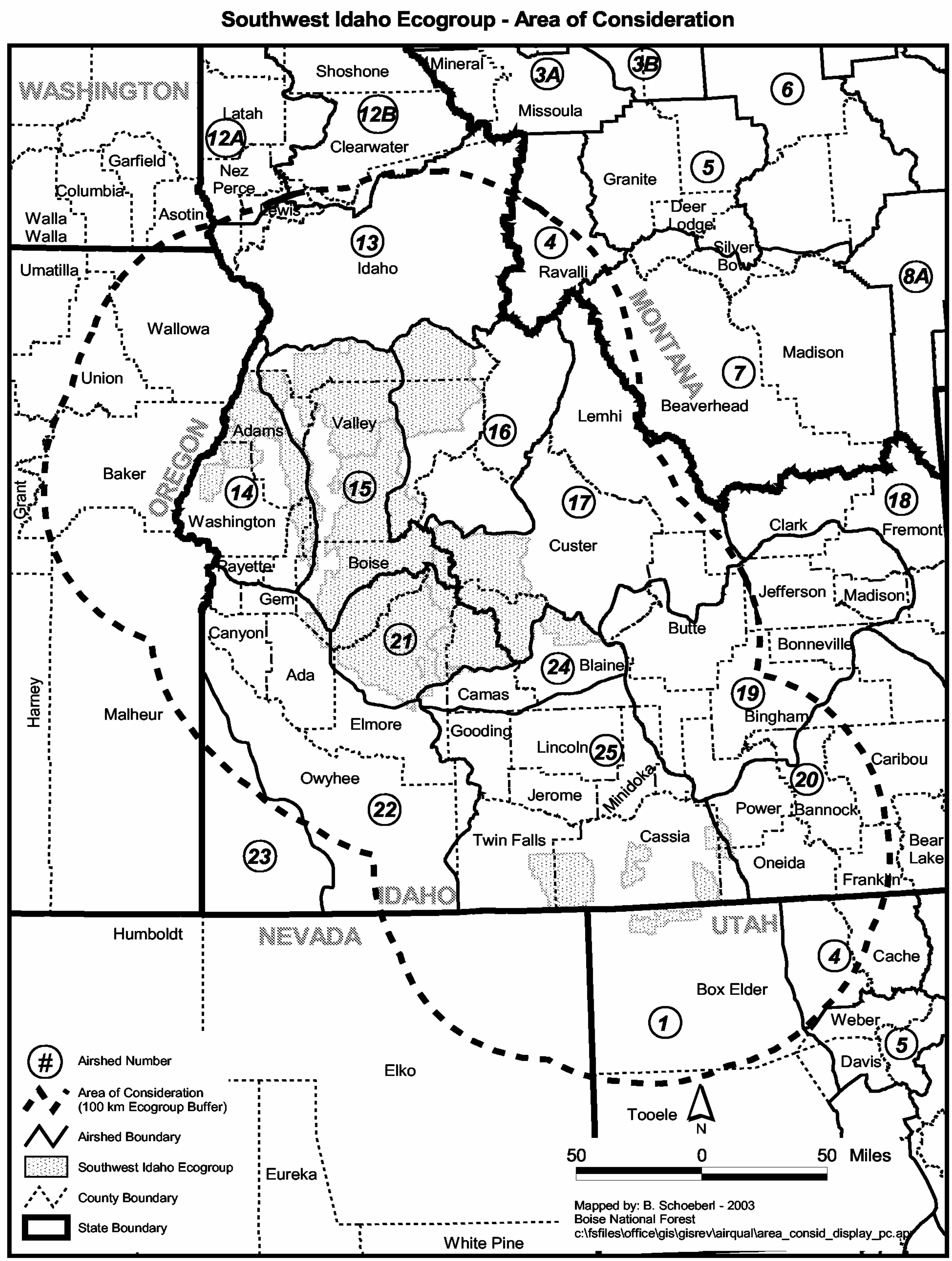
The actual amount of smoke produced and the impacts of that smoke are too variable to predict. Implementation of fire use to manage vegetation or treat activity fuels will vary from these estimates depending on the results of future project analysis, evaluation of other kinds of fuels treatment, available prescription windows, budgets, and numerous other factors. Potential emissions from wildfires are also unpredictable, as they vary depending on site-specific vegetative and fuels conditions, ignitions, weather, and available suppression resources. The comparison described here is intended to show how smoke emissions may vary based on the theme, Management Prescription Categories, and desired conditions for an alternative.

Affected Area

Airsheds and Counties

The Southwest Idaho Ecogroup area of consideration includes sensitive areas within a 100-kilometer (approximately 62-mile) perimeter from the administrative boundaries of the Ecogroup Forests (Figure AQ-1). This distance was chosen based on National and Regional guidance as it covers a potential impact zone that corresponds to the distance smoke may influence surrounding areas (USDA Forest Service 2000). The Ecogroup also falls partially or wholly into airsheds identified or recognized by the states. Airsheds are geographical areas in which dispersion characteristics are similar. Two sets of airsheds have been identified for Idaho but for purposes of this analysis, we used those designated by the Montana/Idaho Airshed Group. Ecogroup administered lands fall within nine Idaho and one Utah airsheds for a total of ten in the area of consideration. The airsheds with Ecogroup Forest administered lands in Idaho are 14, 15, 16, 17, 20, 21, 22, 24, and 25, and the one in Utah is 1.

Figure AQ-1. Southwest Idaho Ecogroup Area of Consideration for Air Quality Effects



Counties within the airsheds were used to provide a geographic context of potential impacts to sensitive areas since available air quality information is generally collected or summarized at this level. Though the entire area of consideration encompasses forty-four counties in six states (Idaho, Utah, Nevada, Oregon, Washington, and Montana), the airsheds occur over 25 counties in Idaho and Utah. Table AQ-3 displays the percentage of county area contained within the airsheds. Of these, sixteen counties contain lands administered by the Ecogroup. Table AQ-4 displays the percentage of Ecogroup administered lands in these sixteen counties. County-level information will be presented for the counties that contain Ecogroup administered lands, as these are the areas within the 100-kilometer area of consideration where emissions may be directly attributable to Ecogroup activities.

Table AQ-3. Percentage of County Area Within Each Airshed

County	Airsheds									
	14	15	16	17	20	21	22	24	25	1
State of Idaho										
Ada[1]						1	99			
Adams	75	25								
Blaine								40	17	
Boise	4	61		21		29	6			
Butte				33						
Camas						49		49		
Canyon							100			
Cassia									99	
Clark				11						
Custer			22	72						
Elmore						52	41	3		
Gem	58						42			
Gooding									96	
Idaho		10	8							
Jerome									100	
Lemhi			39	61						
Lincoln									96	
Minidoka									83	
Oneida					85					
Owyhee							61		15	
Payette	48						52			
Power					56					
Twin Falls							11		89	
Valley		61	37							
State of Utah										
Box Elder										81

[1]Grey shaded boxes are counties that contain Ecogroup administered lands.

Sensitive Areas

Air Quality sensitive areas include places that may experience smoke related impacts to health, visibility, and public (transportation) safety. For this EIS, we considered population centers and Impact Zones, non-attainment areas/maintenance areas, Class I areas, and major travel routes and airports as sensitive areas appropriate to address for this coarse-scale analysis. All of these types of areas are represented within the 100-kilometer area of consideration (Figure AQ-2). Non-attainment and mandatory Class I areas are designated through federal and state processes. Other sensitive areas have been identified through other processes. Evaluation of smoke impacts during finer scale or project-level analysis may include other types of sensitive areas such as hospitals, airstrips, and campgrounds, but these are too fine-scale to be evaluated for this EIS.

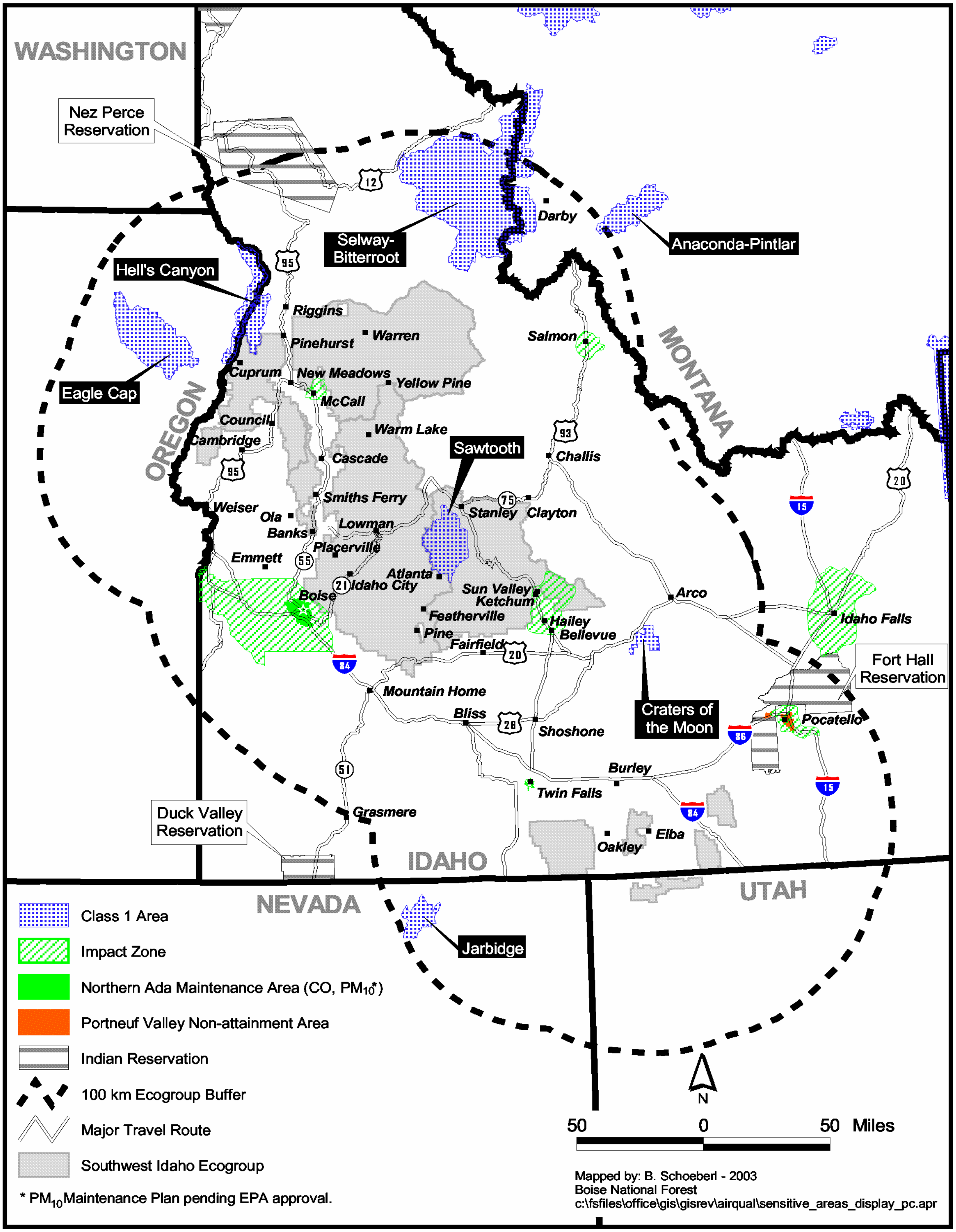
Table AQ-4. Percentage of Ecogroup Administered Lands Within each County by Forest

County	Forest			
	Boise	Payette	Sawtooth	Total
State of Idaho				
Ada	0.5			0.5
Adams	0.1	55		55.1
Blaine			29	29
Boise	65		6	71
Camas			46	46
Cassia			24	24
Custer			15	15
Elmore	32		8	40
Gem	17	0.1		17.1
Idaho		15		15
Oneida			1.9	1.9
Power			3.2	3.2
Twin Falls			7.5	7.5
Valley	33[1]	38		71
Washington		13		13
State of Utah				
Box Elder			1.7	1.7

[1]Does not include Frank Church – River of No Return Wilderness contained within the administrative boundary of the Boise Forest

Public Health – There are two non-attainment/maintenance areas in the area of consideration. The Northern Ada County Non-attainment/Maintenance Area that includes Boise, and the Portneuf Valley Non-attainment Area near Pocatello, are two locations that do not currently meet, or have violated in the past, NAAQS for some of the criteria pollutants (e.g., particulate matter). All other non-attainment areas surrounding the Ecogroup are beyond the 100-kilometer area of consideration and only wildfires would have the magnitude to contribute to existing pollutant levels in these areas. The Montana/Idaho Airshed Group has also defined several population centers as "Impact Zones" (Montana/ Idaho Airshed Group 2003). These are special protection areas that have been determined to be smoke sensitive. There are six Impact Zones identified within the airsheds. These include Boise, McCall, Salmon, Sun Valley/Ketchum, Twin Falls, and Pocatello. In addition, there are many other population centers within the area of consideration including two Indian Reservations; the Nez Perce Reservation north of the Payette Forest, and the Fort Hall Reservation east of the Sawtooth Forest. The Duck Valley Reservation lies to the south and west of the Boise and Sawtooth Forests outside the area of consideration.

Figure AQ-2. Representative Sensitive Areas within the Southwest Idaho Ecogroup Area of Consideration for Air Quality Impacts



Visibility Impairment (Mandatory Class I Areas) – The Sawtooth Wilderness and Hells Canyon Wilderness are two mandatory Class I areas adjacent to or surrounded by lands administered by the Ecogroup. In addition, there are five other Class I areas within the 100-kilometer area of consideration. These include the Eagle Cap Wilderness (Oregon), Craters of the Moon National Monument (Idaho), Selway-Bitterroot Wilderness (Idaho-Montana), Anaconda-Pintlar Wilderness (Montana), and Jarbidge Wilderness (Nevada).

Public (Transportation) Safety – Public safety, which considers the impacts of smoke on transportation safety including roads and airports, is another potential concern. Smoke can affect visibility on roads creating hazardous conditions for travelers. Smoke can be especially hazardous in low-lying areas where fog can form, further reducing visibility. Several traffic accidents have occurred on highways in Oregon and the Southeast U.S. from visibility reductions due to smoke. Hazy conditions can also affect aviation operations at airports by reducing visibility. There are several primary travel routes (e.g. highways) and airports throughout the area of consideration. Potential impacts of smoke effects on visibility and impacts to transportation safety depend on amount, timing, and location of fire use, and the meteorological conditions that influence dispersion. Potential effects of smoke on specific areas related to transportation safety cannot be evaluated at this scale because of the spatial and temporal nature of this concern. They will not be discussed or analyzed further in this document. Mitigations for these areas are considered as part of project-level planning and implementation.

Direct, Indirect, and Cumulative Effects Analysis and Areas

The affected areas for direct and indirect effects to air quality are the Ecogroup airsheds. Direct and indirect effects can occur at sensitive areas within airsheds from activities or actions on Ecogroup administered lands alone. Cumulative effects can occur based on activities or actions on Ecogroup administered lands in combination with effects from other sources. Cumulative effects are also described for some sensitive areas contained within the 100-kilometer perimeter. Although pollutants (particulate matter) can travel distances farther than 100-kilometers, it is difficult to evaluate potential impacts on sensitive areas beyond the area of consideration.

At the scale of this EIS, it is also not possible to predict the direct and indirect effects on NAAQS, visibility impairment, or regional haze. Rather the effects are qualitatively discussed by alternative in terms of seasonality, frequency, duration, and magnitude (amount of emissions). Emissions information at the county level is used to provide a context for risks to air quality based on what occurred in the past, the sources of the emissions, and what may occur in the future. Counties also provide the context for how much smoke may be produced by Ecogroup activities based on the amount of area managed by the Ecogroup and the types of vegetation that occurs. Though estimated emissions for the alternatives are modeled Forest-wide, the amount of Ecogroup area, the types of burning expected to take place for an alternative, and meteorological patterns can be used to determine the risk of effects on sensitive areas within an airshed.

CURRENT CONDITIONS

The words "air pollution" call up images of smog hanging over cities, smoke coming from a stack at a factory, or a dark cloud from a car's tailpipe. This is not the case for the Ecogroup. Current air quality is generally good to excellent for the Ecogroup airsheds, with visibility interrupted at certain times by smoke from wildfires and fire use (IDEQ 2001). In historical times, air quality was determined by lightning events and occasional smoke from human-caused fires. Smoke, dust, and chemicals can adversely affect air quality. Though all of these pollutants occur naturally, human activities have elevated the levels of some of these pollutants above historical levels in some areas.

Historically smoke produced from fire is suspected to have reduced visibility more than currently occurs from wildfire and fire use during some summer months (Greater Yellowstone Area 1999). No information is available on how the distribution of visibility conditions at present differs from the profile under "natural" conditions, but currently, the cleanest 20 percent of the days probably approach natural conditions (GCVTC 1996).

Designated Sensitive Areas

Non-attainment and Maintenance Areas

Ambient air monitoring for health-based state and National Ambient Air Quality Standards has been centered on larger urban populations in Idaho. In some cases monitoring has shown exceedances of standards in several areas. An area that is found to be in violation of a primary NAAQS is labeled a non-attainment area. An area once in non-attainment but recently meeting NAAQS, and with appropriate planning documents approved by EPA, is called a maintenance area. Northern Ada County, including the area surrounding the city of Boise, was designated as a non-attainment area for carbon monoxide, and is currently in non-attainment status for particulate matter (PM 10). The non-attainment for carbon monoxide occurred starting in 1977. Due to control measures instituted, many of them related to new vehicle emissions standards, carbon monoxide standards had not been violated since 1991. IDEQ, Air Quality Division, finalized a Maintenance Plan that explained how the area would ensure that carbon monoxide levels remain below the standard in the future. EPA approved the Carbon Monoxide Maintenance Plan in December 2002, which demonstrates that the area is now in attainment of the carbon monoxide standard. It also outlines steps to ensure that the area will remain so.

Northern Ada County was designated as non-attainment for particulate matter (PM 10) in 1987. Again, standards for this pollutant have not been violated since 1991. In September 2002, IDEQ submitted the Northern Ada County PM 10 Maintenance Plan to EPA. This plan demonstrates compliance with the PM 10 standard through 2020. EPA is expected to approve this plan in the summer of 2003. When approved, Northern Ada County will return to attainment status for PM 10 (be designated a PM 10 maintenance area).

Originally Portneuf Valley PM 10 Non-attainment Area was part of the Power/Bannock Counties Non-attainment Area, but this area was split into two areas. The Portneuf Valley PM 10 Non-attainment Area covers slightly over 96 square miles near Pocatello, Chubbuck, and surrounding areas. The last exceedance in this area from 1989 through 1998 was in 1993. Through 1997 the area generally had a favorable trend, but levels had increased in 1998. Like the Northern Ada County Non-attainment Area, areas tend to experience the highest concentrations of pollutant levels in the winter months (December, January, and February) when dispersion is reduced.

No areas within Idaho have been designated yet for PM 2.5 status. The IDEQ began establishing PM 2.5 network across the state in 1998 near larger urban centers. Data from this time period shows levels below the NAAQS. However, there has not been a serious weather stagnation event that could result in a build up of this pollutant since monitoring began. In 2001, IDEQ expanded their PM 2.5 monitoring network to include more rural areas such as Idaho City and McCall. These monitors were established as part of a special purpose network and therefore are not used to determine attainment status. However, beginning in 2003 additional monitors will be added to the state's network to start this process. During this same year, it is expected that attainment status for PM 2.5 will begin for those areas where monitoring has been in place for at least 3 years.

Visibility Impairment (Mandatory Class I Areas)

Current visual conditions for Class I areas adjacent to or surrounded by the Ecogroup area are among the best in the western U.S (IDEQ 2003, US EPA November 2001). Visibility in the West is generally better than in the East due in part to the lower relative humidity, as visibility conditions are affected by the scattering and absorption of light by particles and gases. In addition, the types and levels of pollutants vary from west to east. The five main types of pollutants that affect visual range are sulfate, nitrate, organic carbon, elemental carbon (soot), and crustal material (soil). In the east, the greatest contributor to visibility impairment is sulfates primarily from fossil fuel combustion. In the west, however the main contributors vary more by season and location, but generally organic carbon is the main contributor (US EPA November 2001, Malm et al. 2000).

For sites in and near the Ecogroup area, elemental carbon contributes the least amount of impairment annually and seasonally. Organic carbon, followed by crustal material, is the next greatest annual and seasonal contributor. Organic carbon and crustal material contribute to the most impairment, relative to other pollutant types, during summer and fall.

The assessment conducted by Ferguson and Rorig (in press) regarding the potential for pollution from industrial sources to reach wilderness areas found that the pollution exposure of the Ecogroup is generally low. This is because the largest sources of industrial emissions affecting the Ecogroup are a long distance to the north and west. Pollutant trajectories are generally north and south of the airflow patterns traveling through the Ecogroup. Most industrial emissions from point sources in Washington, Oregon, California, and western Idaho are well dispersed before entering the Ecogroup area. The Sawtooth Wilderness has the most exposure in the Ecogroup from relatively low levels of particulate matter emitted by industrial sources during the summer months. Although some mapped trajectories indicate impacts from sources that are a long distance from Class I areas, topography of the region and simplicity in the modeling used suggest the greatest threats to air quality are primarily from nearby sources.

Visibility conditions in Class I areas are monitored using the IMPROVE network. Visibility indices are calculated for Class I areas based on this monitoring information. Standard visual range estimates have been derived from camera, aerosol, and optical data from Class I areas. Standard visual range (SVR) is the greatest distance at which an observer can just see a black object viewed against the horizon sky. SVR estimates for the Class I wilderness areas within or adjacent to the Ecogroup are similar. Table AQ-5 displays these data by Class I areas that occur within the area of consideration.

Table AQ-5. Calculated Visibility Indices[1] for Class I Areas Within the Area of Consideration

Class I Area	Visibility Indices					
	Clear (90^{th} percentile)		Median (50^{th} percentile)		Hazy (10^{th} percentile)	
	SVR[2] (miles)	Fine Mass[3]	SVR[2] (miles)	Fine Mass[3]	SVR[2] (miles)	Fine Mass[3]
Eagle Cap Wilderness	191	No data	114	No data	53	No Data
Hells Canyon Wilderness	197	No data	110	No data	60	No Data
Selway-Bitterroot Wilderness	153	.7 – 1.1	115	2.0 – 2.3	71	4.7 – 8.4
Anaconda-Pintlar Wilderness	170	n/a	103	n/a	52	n/a
Sawtooth Wilderness	161	.9 – 1.3	109	1.9 – 2.8	53	4.0 – 8.2
Craters of the Moon National Monument	n/a	1.0 – 1.7	n/a	2.3 – 3.5	n/a	5.2 – 8.0
Jarbidge Wilderness	169	1.0 – 1.6	106	2.1 – 3.7	65	4.4 – 7.5

[1]Data from National Air Resource Management Program Web Page
[2]SVR=Standard Visual Range
[3] Fine mass=PM 2.5

Fine mass concentrations can be correlated to visual range by season using this data. Visibility indices can be used to reveal seasonal and annual variation. The season with the best visibility occurs most often in the winter whereas the season with the worst visibility is in the summer (Malm et al. 2000, US EPA 2001). Visibility impairment in the spring and fall is generally similar. Preliminary data from the Sawtooth Wilderness follows this seasonal pattern for best and worst periods of visibility in that winter is best and summer is worst (Copeland 2001). Although monitoring data indicates the types of pollutants that impact visibility, additional data collection and analysis is necessary to determine the sources of these pollutants, especially since many sources emit similar types of pollutants. In addition, it is often unknown if the source of the pollutant is close to or far away from the monitor since fine particulates can travel hundreds of miles from their origination point.

Other Sensitive Areas

Because emissions information is collected at the county level, counties were used as an indicator of potential impacts to sensitive areas. Counties are nested within airsheds, which provide the geographic context of where potential fire use activities may take place based on vegetative types (fire regimes) and kinds of fire use. Counties within the larger area of consideration were used to evaluate the current condition and as a relative gauge for potential concerns regarding particulate matter transport. Counties containing or adjacent to Ecogroup administered lands were used to evaluate the existing condition and emission sources.

Existing Sources and Emission Levels for Counties

Summary of Emission Levels and Sources of Particulate Matter

Nationally in 1998 Idaho ranked 14th highest for PM 10 and 17th for PM 2.5 from anthropogenic (human-caused) sources (US EPA March 2000). Montana ranked higher for PM 10 and PM 2.5 (6th and 12th respectively). Oregon, Washington and Utah ranked lower than Idaho. Nevada was ranked among the lowest nationally for PM 10 and PM 2.5 at 44th.

Sources of Particulate Matter (PM 10 and PM 2.5) Emissions by Counties

Information from the EPA National Emissions Trend (NET) database was used to develop trends and annual averages based on a 5-year period (1995 through 1999) for PM 10 and PM 2.5. This database was also used to determine contribution toward the total PM 10 or PM 2.5 emissions from various sources based on 1999 data (US EPA undated).

The NET system is a national repository database compiled by EPA. The NET blends state and local-supplied data with EPA-derived data to form a comprehensive national inventory of criteria and toxic pollutants (US EPA 1999). Estimates are added to the inventory each year, with increasing levels of detail in the more recent years. As a result, the NET reflects the latest information available. However the NET inventory does not always include state data for any particular source or pollutant. The NET database contains an aggregate of annual emissions of criteria air pollutants from all types of sources by county. Sources of particulate matter come from any number of point, mobile, or area sources. Point sources are stationary sources of emissions, such as an electrical power plant that has a name and location. Area sources are small point sources or diffuse stationary sources that do not qualify as a point source. Mobile sources are any kind of vehicle or equipment that has a gasoline or diesel engine. Mobiles sources are combined with area sources within the NET database. A NET Tier report includes emissions from area sources such as vehicles, residences, and wildfires. Areas sources are not identified individually either, but rather their emissions are estimated in aggregate. Area source categories are nested under “Miscellaneous” and are further broken down by types of activities that generate particulate matter. Sub-categories for “Miscellaneous” are “Agriculture and Forestry”, “Other Combustion”, and “Fugitive Dust”. The sub-category Agriculture and Forestry generally include emissions from activities such as agricultural crops or tilling and feedlots. The sub-category Fugitive Dust generally includes estimates for dust generated by activities such as travel on unpaved roads and construction. The sub-category Other Combustion includes estimates primarily from wildfires and may include prescribed burning or other “managed” burning. It is difficult to tell from the data how much of the emissions estimates included managed burning for various purposes such as forest and rangeland and/or agriculture. Wildfires are also estimates aggregated to the county level, but errors can be introduced due to the methods used to apportion wildfire acres burned and therefore emissions.

The amount of emissions in an area is only an indicator of the potential to have an effect on ambient air concentrations and cannot be directly related to the NAAQS. However, the amount of emissions can be used as a relative indicator to identify areas of concern. Areas of concern would be any area that has existing high levels of emissions and where fire use activities are expected to greatly increase emissions. Additional concern would exist if increased emissions, along with topographic or meteorological conditions, could hinder dispersion. Several of the non-attainment areas within the area of consideration have these kinds of compounding effects, which increase ambient air concentrations to a level that can exceed standards.

Of interest are the trend and amount as well as the sources of particulates emitted and the spatial relationship of the emissions. Figures AQ-3 and AQ-4 display the PM 10 and PM 2.5 emissions for the counties within and around the area of consideration. The sixteen counties with Ecogroup administered lands within their boundaries are among the lowest for total tons of PM 10 and PM 2.5 emissions.

Tables AQ-6 and AQ-7 display the relative ranking of annual average particulate matter emissions from 1995 through 1999 and describe the trend over that period (US EPA undated). Counties highlighted in gray are those that contain Ecogroup administered lands. Idaho counties are ranked relative to the counties within the area of consideration. The Sawtooth National Forest has administered lands within one county in Utah (Box Elder). One other Utah county (Cache) is within the area of consideration but was not included due to the small amount of area captured by the boundary. The tables also indicate which counties have non-attainment or maintenance areas within them. However, this does not mean that the entire county has been designated as non-attainment/maintenance.

Table AQ-6. PM 10 Emissions Data Summary (1995 – 1999) for Idaho and Utah Counties

State – County	Sensitive Area Within County		Relative Rank	PM 10 Trend Description	PM 10 Annual Avg. (tpy)[1]
	Non-attainment or Maintenance	Impact Zone			
Idaho – Canyon	N	Boise	1	Improving	47,612
Idaho – Ada[2, 3]	PM 10 Non-attainment, CO Maintenance (Northern Ada Co.)	Boise	2	Improving	28,395
Idaho – Bingham	N		3	Improving	25,610
Idaho – Twin Falls	N	Twin Falls	4	Improving	25,564
Idaho – Idaho	N		5	Improving	16,678
Idaho – Jefferson	N		6	Improving	15,804
Idaho – Clearwater	N		7	Improving	15,148
Idaho – Cassia	N		8	Improving	14,550
Idaho – Nez Perce	N		9	Improving	13,163
Idaho – Minidoka	N		10	Improving	11,802
Idaho – Bannock	PM 10 (Portneuf Valley)	Pocatello	11	Improving	11,742

State – County	Sensitive Area Within County		Relative Rank	PM 10 Trend Description	PM 10 Annual Avg. (tpy)[1]
	Non-attainment or Maintenance	Impact Zone			
Idaho – Owyhee	N		12	Improving	11,391
Idaho – Jerome	N		13	Improving	10,710
Idaho – Payette	N		14	Improving	10,413
Idaho – Elmore	N		15	Improving	9,415
Idaho – Valley	N	McCall	16	Improving	9,365
Idaho – Gooding	N		17	Improving	9,098
Idaho – Blaine	N	Sun Valley/ Ketchum	18	Improving	8,928
Idaho – Power	PM 10 (Fort Hall)	Pocatello	19	Improving slightly	8,249
Idaho – Gem	N		20	Improving	7,749
Idaho – Caribou	N		21	Improving	6,052
Idaho – Lewis	N		22	Improving	6,034
Idaho – Franklin	N		23	Improving	5,845
Idaho – Camas	N		24	Improving	5,556
Idaho – Washington	N		25	Improving	4,805
Idaho – Boise	N		26	Improving	4,803
Idaho – Lemhi	N	Salmon	27	Improving	4,562
Idaho – Oneida	N		28	Improving	4,523
Idaho – Adams	N		29	Improving	4,426
Idaho – Custer	N		30	Improving	3,939
Idaho – Lincoln	N		31	Improving	3,667
Idaho – Butte	N		32	Improving	3,291
Idaho – Clark	N		33	Improving slightly	1,442
Utah – Box Elder	N	N/A	9b	Improving	13, 162

[1]tpy = tons per year
[2]The maintenance plan for PM 10 is expected to be approved by EPA in summer of 2003
[3]Gray-shaded boxes are counties that contain Ecogroup Forest administered lands.

Table AQ-7. PM 2.5 Emissions Data Summary (1995 – 1999) for Idaho and Utah Counties

State – County	Sensitive Area Within County		Relative Rank	PM 2.5 Trend Description	PM 2.5 Annual Avg. (tpy)[1]
	Non-attainment or Maintenance	Impact Zone			
Idaho - Clearwater	N/A		1	Increasing Slightly	9,490
Idaho – Canyon	N/A	Boise	2	Constant	8,872
Idaho – Idaho[2]	N/A		3	Constant	6,798
Idaho – Ada	N/A	Boise	4	Improving Slightly	6,155
Idaho – Twin Falls	N/A	Twin Falls	5	Improving Slightly	5,298
Idaho – Nez Perce	N/A		6	Constant	5,196
Idaho – Bingham	N/A		7	Improving Slightly	4,568
Idaho – Valley	N/A	McCall	8	Constant	4,158
Idaho – Camas	N/A		9	Improving [3]	4,041

State – County	Sensitive Area Within County		Relative Rank	PM 2.5 Trend Description	PM 2.5 Annual Avg. (tpy)[1]
	Non-attainment or Maintenance	Impact Zone			
Idaho – Owyhee	N/A		10	Constant	3,871
Idaho - Jefferson	N/A		11	Improving Slightly	2,903
Idaho – Power	N/A	Pocatello	12	Constant	2,865
Idaho – Cassia	N/A		13	Constant	2,814
Idaho – Bannock	N/A	Pocatello	14	Improving Slightly	2,490
Idaho – Minidoka	N/A		15	Constant	2,151
Idaho – Blaine	N/A	Sun Valley/ Ketchum	16	Constant	2,122
Idaho – Elmore	N/A		17	Constant	2,120
Idaho – Jerome	N/A		18	Constant	1,939
Idaho – Gem	N/A		19	Improving Slightly	1,870
Idaho – Boise	N/A		20	Constant	1,839
Idaho – Payette	N/A		21	Constant	1,821
Idaho – Lewis	N/A		22	Constant	1,682
Idaho – Adams	N/A		23	Constant	1,622
Idaho – Gooding	N/A		24	Improving	1,618
Idaho – Caribou	N/A		25	Improving Slightly	1,334
Idaho – Lemhi	N/A	Salmon	26	Improving	1,069
Idaho – Franklin	N/A		27	Constant	1,019
Idaho – Washington	N/A		28	Constant	911
Idaho – Oneida	N/A		29	Improving Slightly	873
Idaho – Custer	N/A		30	Constant	746
Idaho – Lincoln	N/A		31	Constant	662
Idaho – Butte	N/A		32	Constant	600
Idaho – Clark	N/A		33	Constant	303
Utah – Box Elder	N/A	N/A	10b	Constant	3,515

[1] tpy = tons per year
[2]Grey shaded boxes are counties that contain Ecogroup administered lands.
[3] While Camas County show improvement over the 5-year period, estimated emissions are actually increasing when a large spike caused by wildfire in 1996 is removed.

Figure AQ-3. Annual average PM 10 emissions from 1995 through 1999 for counties within the Southwest Idaho Ecogroup Area of Consideration for Air Quality Effects

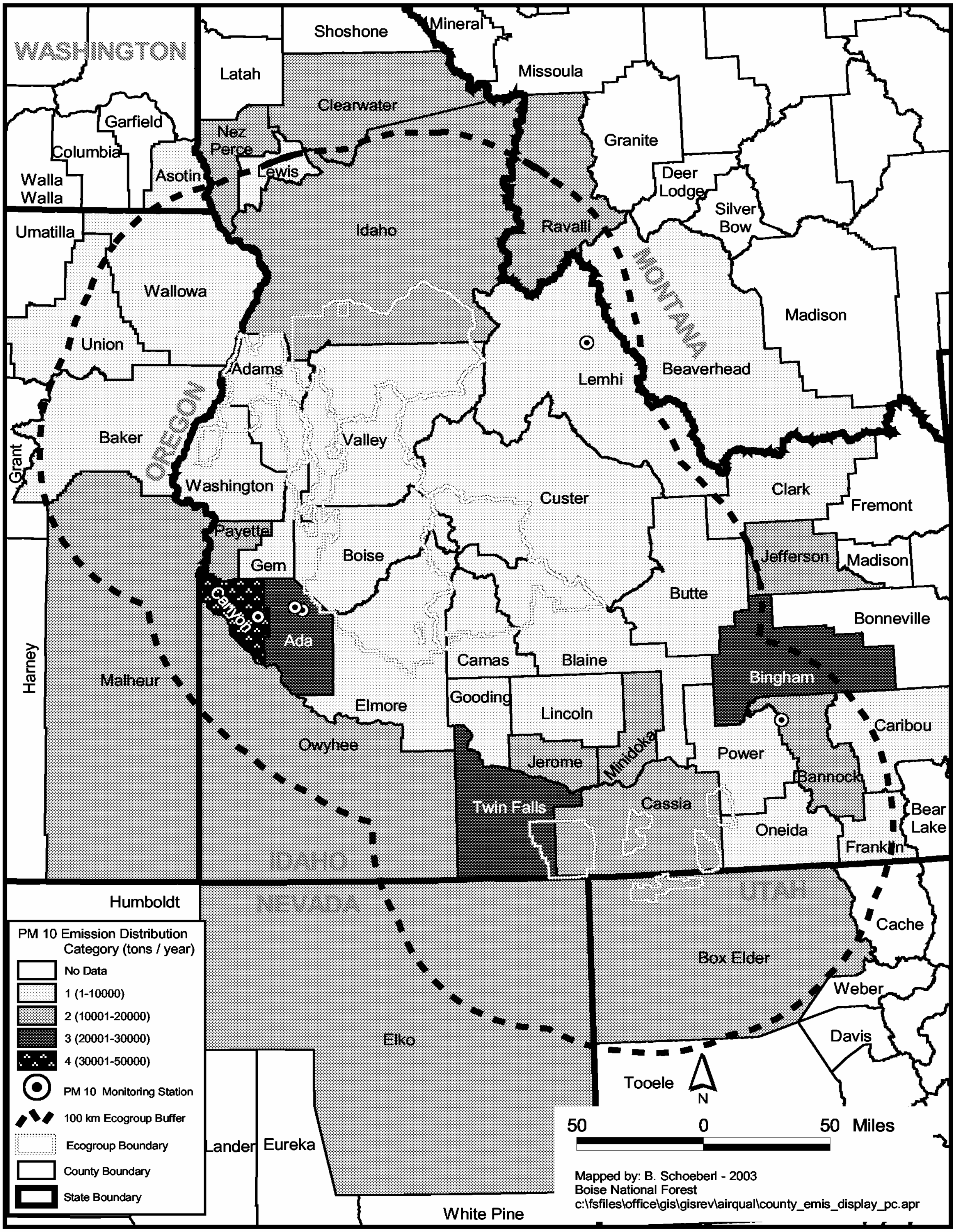
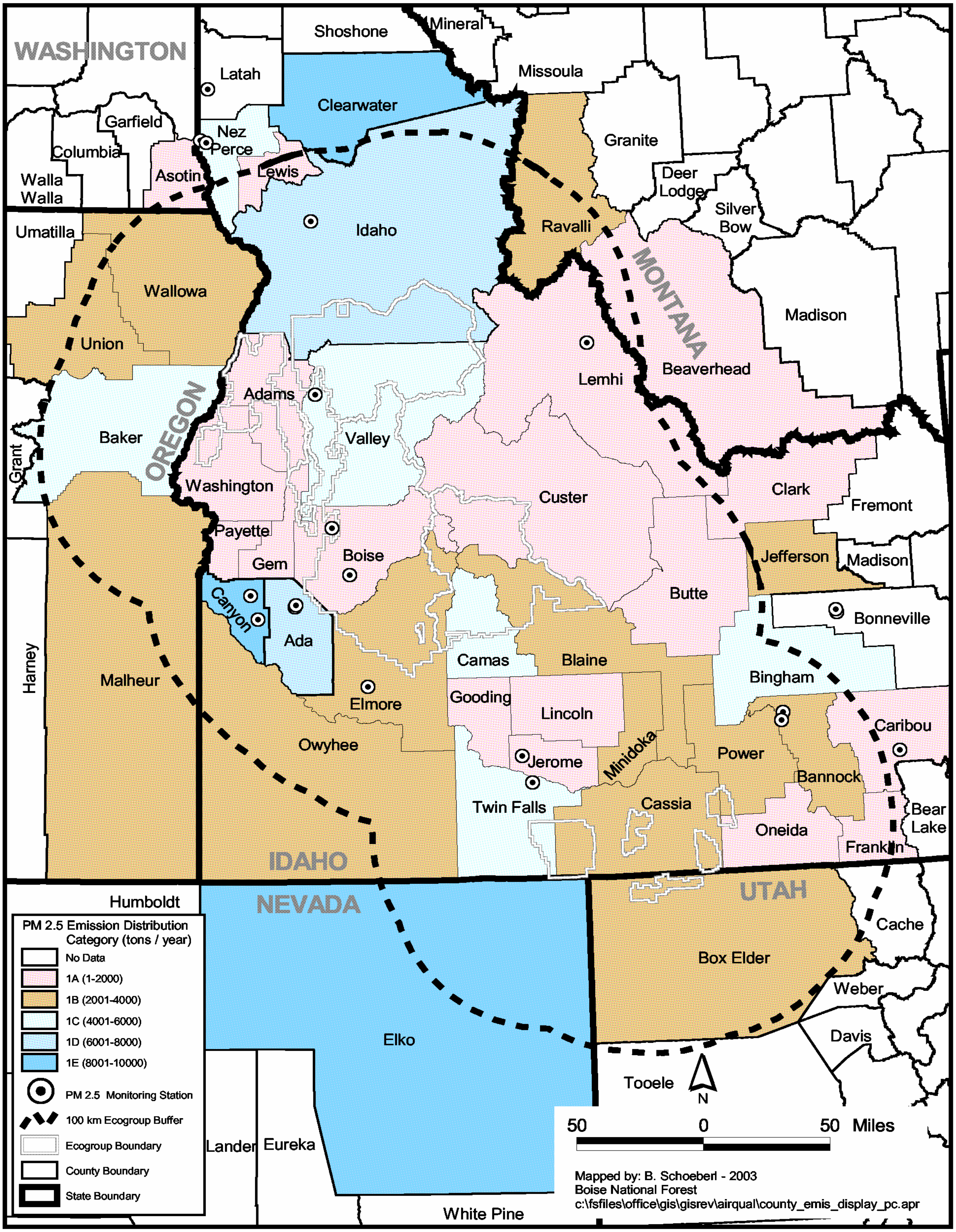


Figure AQ-4. Annual average PM 2.5 emissions from 1995 through 1999 for counties within the Southwest Idaho Ecogroup Area of Consideration for Air Quality Effects



The counties with the highest PM levels are often associated with urban population centers such as Canyon and Ada and/or agricultural activities such as tilling in counties like Twin Falls or Bingham. Tilling, along with road construction and use of unpaved roads, contribute to estimates of Fugitive Dust. Fugitive Dust estimates for many counties account for greater than 50 percent of total annual PM 10 emissions.

Few point sources exist in counties that have Ecogroup administered lands within their boundaries. Counties with point sources include Gem, Elmore, Twin Falls, and Power. Power and Gem have the highest levels of emissions from point sources. Point sources in Power County contribute about 2,000 tons per year of PM 10. These sources, which are often located in close proximity to population centers, can contribute to air quality concerns when combined with local topographic influences and weather patterns (e.g. inversions).

In general, most counties with Ecogroup administrative areas within their boundaries have an improving trend in emissions largely due to reductions in Fugitive Dust. While Fugitive Dust is a large proportion of reported emissions, it is also a source that may travel only a few kilometers from its origin (US EPA March 2000). The effects to ambient air quality and visibility impairment would most likely be localized. There are exceptions during unusual episodes where dust can be transported thousands of miles. In the spring of 1998 and 2000 widespread events in the western U.S. were attributed to dust originating in China and Mongolia combined with special meteorological conditions. PM 2.5, because it is smaller than PM 10, can travel greater distances. Therefore, sources that produce more PM 2.5 than PM 10 can have impacts farther away.

Fire is also used for other purposes including crop residue disposal and weed abatement. This type of open burning is more prevalent in rural counties where agriculture is common. Table AQ-8 displays the acres and tons of residue burned by county from a survey conducted for 15 western states (ERG and Enviro-Tech 2002). While this information is not intended to show average annual amounts since the data is based on a single year, it allows for a county-to-county relative comparison. Comparison ratings range from very low to very high.

Table AQ-8. Acres Burned, Crop Residue Burned (in tons), and Relative Rating of Counties in the Area of Consideration

County[1] - State	Totals		Relative Rating
	Acres Burned	Residue Burned (tons)	
Ravalli, MT	15	30	Very Low
Beaverhead, MT	80	150	Very Low
Boise, ID	81	216	Very Low
Elko, NV	144	[2]	Very Low
Adams, ID	589	1,614	Very Low
Valley, ID	581	1,811	Very Low
Baker, OR	[2]	1,998	Very Low
Clearwater, ID	1,794	3,341	Very Low
Lemhi, ID	1,270	3,455	Very Low

County[1] - State	Totals		Relative Rating
	Acres Burned	Residue Burned (tons)	
Custer, ID	1,528	3,667	Very Low
Gem, ID	1,912	4,069	Very Low
Wallowa, OR	[2]	4,113	Very Low
Payette, ID	2,401	5,156	Low
Clark, ID	2,832	5,978	Low
Asotin, WA	2,950	6,431	Low
Camas, ID	3,003	6,178	Low
Blaine, ID	3,495	6,981	Low
Washington, ID	3,302	7,235	Low
Gooding, ID	4,069	8,459	Low
Butte, ID	4,376	8,464	Low
Ada, ID	3,929	8,526	Low
Owyhee, ID	4,042	8,864	Low
Lincoln, ID	4,635	9,374	Low
Elmore, ID	5,010	10,346	Mod Low
Franklin, ID	7,247	14,757	Mod Low
Union, OR	[2]	18,144	Mod Low
Jerome, ID	9,304	18,837	Mod Low
Box Elder	9,672	18,891	Mod Low
Bannock, ID	9,515	19,918	Mod Low
Oneida, ID	10,118	20,808	Moderate
Canyon, ID	10,097	21,118	Moderate
Idaho, ID	13,441	25,704	Moderate
Malheur, OR	[2]	25,731	Moderate
Minidoka, ID	13,023	25,812	Moderate
Jefferson, ID	14,098	27,552	Moderate
Fremont, ID	15,779	30,053	Mod High
Twin Falls, ID	14,861	30,461	Mod High
Nez Perce, ID	17,614	33,603	Mod High
Caribou, ID	18,719	36,078	Mod High
Lewis, ID	19,951	38,387	Mod High
Power, ID	21,813	44,738	High
Cassia, ID	22,515	45,929	High
Bingham, ID	26,196	52,729	Very High

[1] Counties highlighted indicate Ecogroup administered lands within the county boundary
[2] Data was not provided from the cited source so totals were omitted

Ecogroup Airsheds

Recent Wildfire and Fire Use Summaries

Recent Wildfire (1981 - 2000) - Wildfires most often occur in July and August in the Ecogroup. In many cases, wildfires remain small and are quickly suppressed. However, occasionally storms ignite multiple fires. Under certain circumstances, particularly in areas with hazardous vegetative conditions, these fires can overwhelm suppression resources. Such fires sometimes become large and burn with high intensities and severities often for weeks, sometimes until snowfall. Fires like these can result in the majority of acres burned by wildfire in any one decade. Smoke from these events can migrate and accumulate in populated or sensitive areas, remaining for several days to weeks, depending on the location and duration of the wildfire.

In a 20-year period some of the airsheds have been greatly affected by wildfires occurring on Ecogroup administered lands (Table AQ-9, Figure AQ-5 and AQ-6). Within the most recent decade (1991-2000) Airsheds 15, 16, and 21 have had the most acres burned by wildfire. Since 1981, 30 percent of the acres in Airshed 21 have been burned by wildfire on Ecogroup administered lands. Most of the acres burned during large events that occurred in the same year, for example in 1994 and 2000.

Table AQ-9. Airshed Size and Percent of Airshed Burned by Large Wildfires (greater than 300 acres) on Ecogroup Administered Lands During Two Decadal Time Periods

Idaho Airsheds	Airshed Size		Percent of Airshed		
	Acres	Square Miles	Most Recent Decade (1991-2000)	Second Decade (1981-1990)	20 - Year Total
14	2,083,640	3,256	2	2	3
15	2,953,870	4,615	13	6	19
16	3,156,400	4,932	14	7	21
17	5,018,750	7,842	N/A[1]	N/A	N/A
21	1,726,160	2,697	28	2	30
24	1,092,370	1,707	N/A	N/A	N/A
25	5,297,680	8,277	1	1	2

[1]N/A designates that there were no wildfires greater than 300 acres

Recent Fire Use (1981-2000) - Fires used to manage resources are generally conducted when weather conditions allow for quick smoke dispersal. Prescribed fires are currently most often implemented in the spring or late fall when weather conditions are better for smoke dispersal while still meeting burning objectives. Weather is a primary factor in determining if an area can be burned under conditions that will meet fire use and air quality objectives. When weather and vegetative conditions (the prescriptive window) are favorable for prescribed burning, the favorable conditions typically extend over several airsheds. Therefore, burners across the airsheds may all be seeking to implement projects at the same time.

Forests within the Ecogroup conduct prescribed fires through the coordinated operations of the Montana/Idaho Airshed Group. Table AQ-10 shows the percentage of area in Idaho airsheds that is managed by federal and state members of the Montana/Idaho Airshed Group. Some airsheds, for example 16, 17, and 21 are managed primarily by member agencies. In Airshed 21, the Ecogroup is the primary land manager, administering 80 percent of the airshed. In Airsheds 14 and 24, only about half the area is managed by Airshed Group members.

Figure AQ-5. Areas Affected by Wildfires Greater than 300 acres on the Northern Portion of the Ecogroup from 1981 through 2000 by Two Decadal Periods

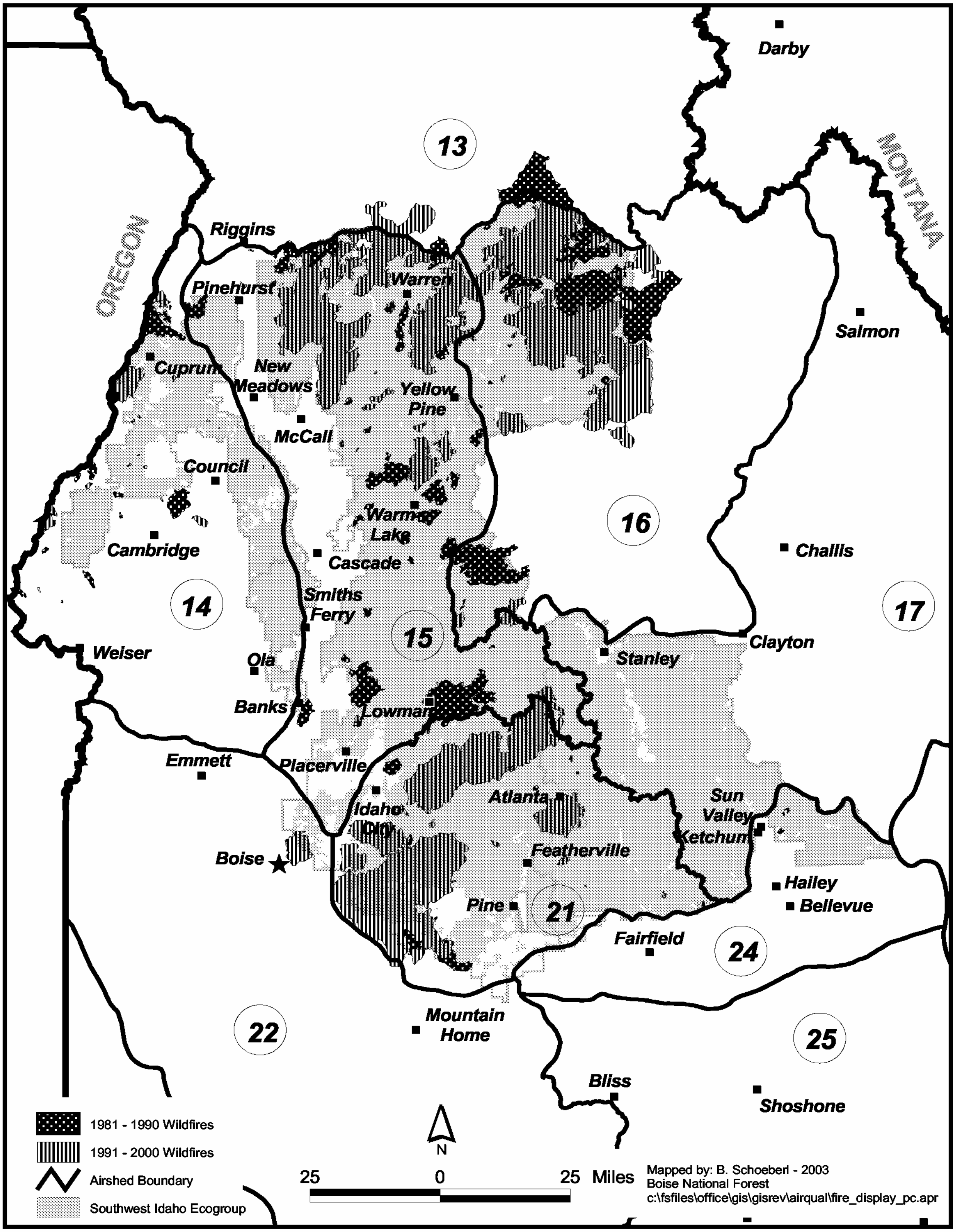


Figure AQ-6. Areas Affected by Wildfires greater than 300 acres on the Southern Portion of the Ecogroup from 1981 through 2000 by Two Decadal Periods

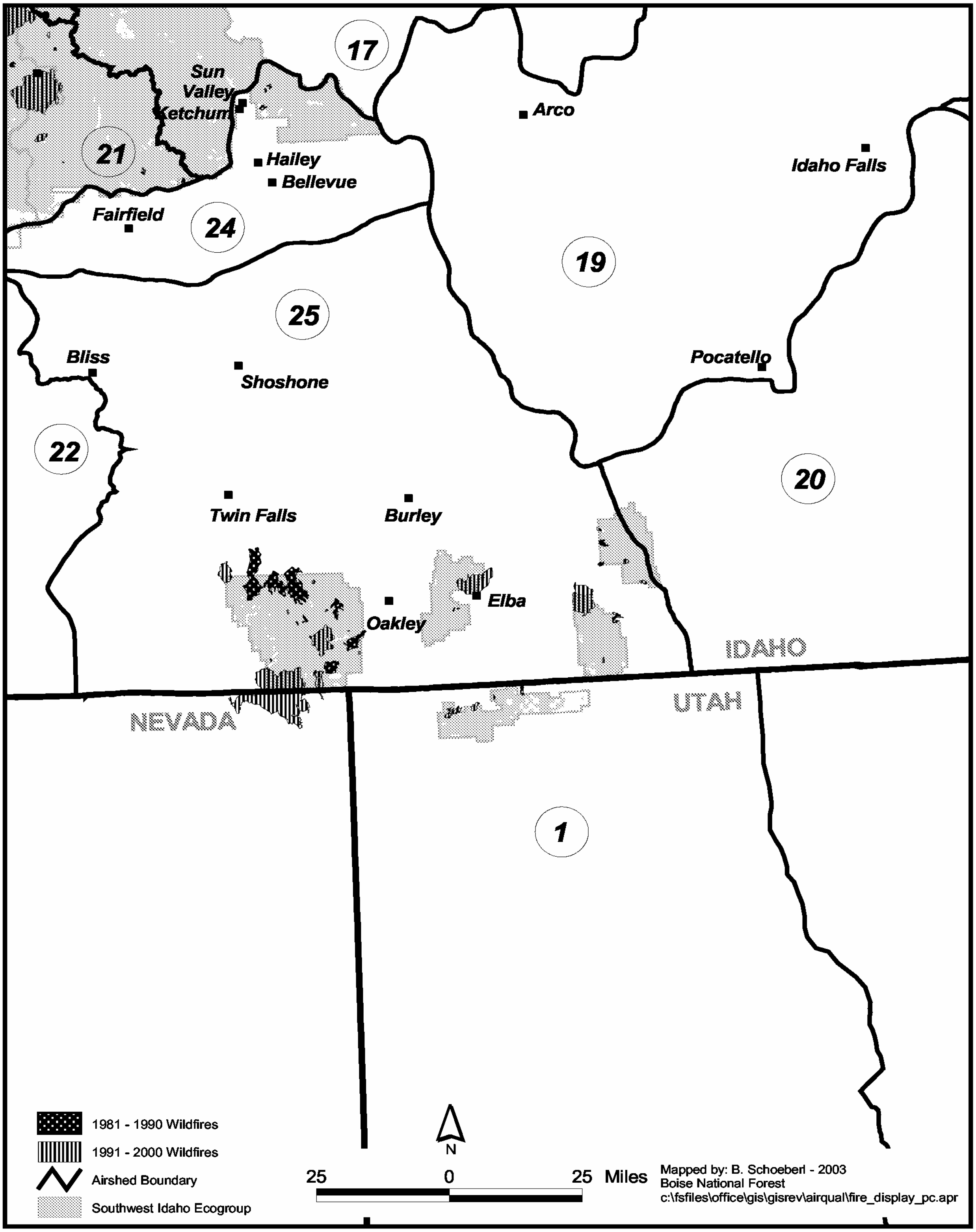


Table AQ-10. Percentage of Lands in Idaho Airsheds Managed by Airshed Group Members

Airshed[1]	Percent within Airshed				
	Boise	Payette	Sawtooth	Ecogroup Total	All Members
14	5	23	0	28	52
15	37	35	2	74	83
16	4	25	<1	29	98
17	0	0	16	16	92
20	0	0	< 1	< 1	48
21	52	0	28	80	89
24	<1	0	14	15	50
25	0	0	10	10	60

[1]Does not include members of the Airshed Group who are private landowners

The amount of burning, and therefore, emissions have varied annually because burn windows or prescriptions to achieve resource management objectives are tied to seasonal and daily weather conditions. The range of prescribed fire acres accomplished by the Ecogroup from 1995 through 1999 reflects this annual variability (Table AQ-11). The Payette and Boise Forests have focused most of the prescribed burning in Airshed 15. Airshed 14, which is primarily the Payette Forest, is the second most active airshed (Figure AQ-7). Though Airshed 21 has had relatively minor amounts of prescribed burning, it has been the airshed most impacted by wildfire in the recent past. Airshed 16 contains part of the Frank Church – River of No Return Wilderness. Resource management burning here has primarily been from wildland fire use, which is not displayed in Table AQ-11.

Table AQ-11. Range and Annual Average Acres Prescribed Burned by the Ecogroup from 1995 – 1999 by Airshed

Airshed	Acres	
	Range over 5 years	Annual Average
14	1,640 – 6,460	3,800
15	1,175 – 21,470	10,955
16	N/A	< 100
17	N/A	< 100
21	0 – 2,620	1,340
24	0 – 500	< 100
25	N/A	< 100
1	N/A	< 100

The amount of prescribed burning conducted in southern Idaho by all Montana/Idaho Airshed Group members is displayed in Figure AQ-8 (Montana/Idaho Airshed Group 2001, 2002). During 2000 and 2001 prescribed burning declined in part due to a moratorium on prescribed fire and the impact of the severe wildfire season. In 2002, the total amount of burning accomplished by member burners was slightly more than what was accomplished in 1999. Over the last four years the number of proposed or planned acres for any given year has remained relatively static.

Figure AQ-7. Acres of Prescribed Burning for the Ecogroup from 1991 through 2000

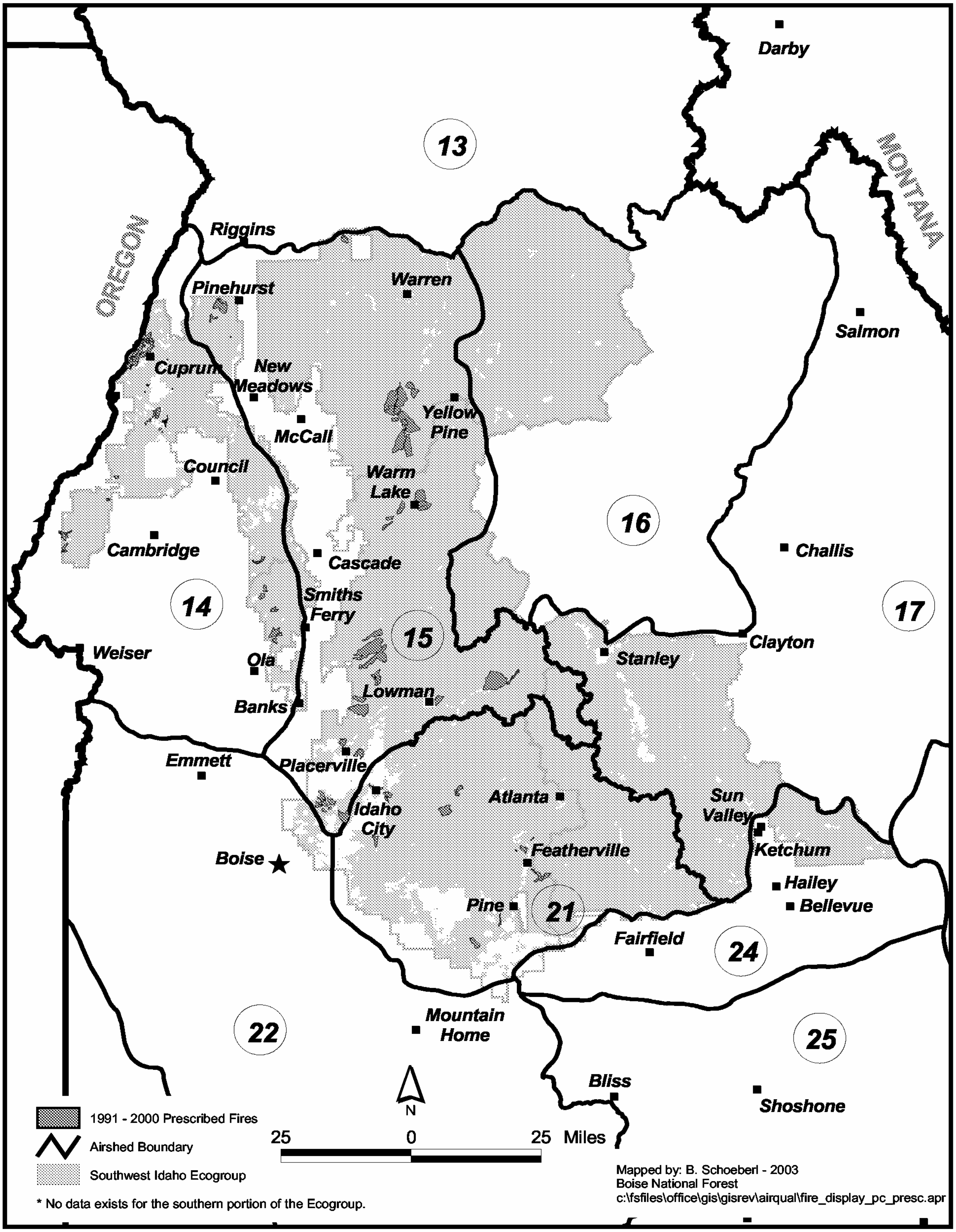
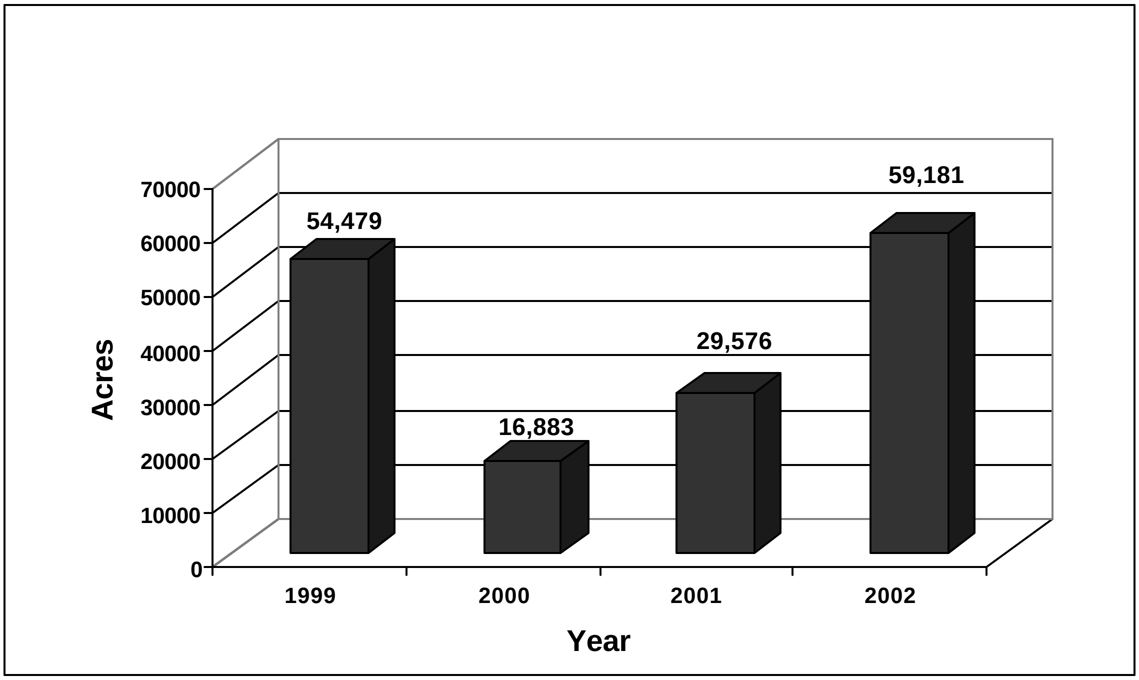


Figure AQ-8. Acres of Prescribed Fire Accomplished by all Members of the Montana/Idaho Airshed Group in South Idaho Airsheds from 1999 through 2001[1]

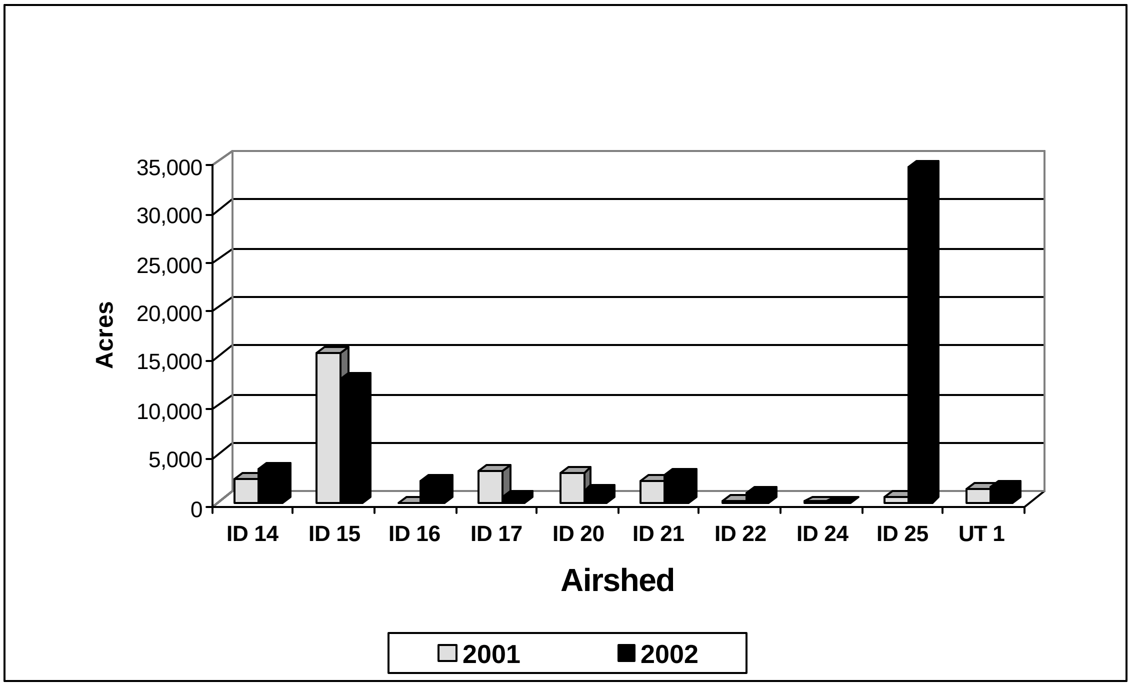


[1]The number of acres accomplished in 2000 is lower, in part, due to the moratorium on the use of prescribed fire placed on federal land management agencies

Figure AQ-9 displays the number of prescribed fire acres accomplished by all member burners in the Airsheds 14, 15, 16, 17, 20, 21, 22, 24, 25, and 1in 2001 and 2002 (Montana/Idaho Airshed Group annual report; Zschaechner 2001, 2002). In airsheds where the Ecogroup manages a large percentage of the area (for example 15 and 21), the amount of burning is within the range of acres accomplished from 1995 through 1999. In the past, the Ecogroup has implemented only a small number of prescribed fire acres in Airshed 25. In 2002, the Bureau of Land Management accomplished burning on a large number of acres in this airshed. In any given year the amount accomplished by all members in some airsheds will vary compared to others. Other National Forests and land management agencies including the Bureau of Land Management will likely implement prescribed burning in airsheds where the Ecogroup manages a small proportion of the airshed.

Currently, only two areas within the Ecogroup have approved plans for wildland fire use. The Frank Church – River of No Return Wilderness has had a fire management plan for wildland fire use since 1985. The Sawtooth Wilderness has had an approved plan since 1997. Like prescribed burning, wildland fire use occurs within a prescriptive window. In the case of wildland fire use, individual fires may be large, or several fires may be managed at one time. Wildland fires, ignited by lightning, usually occur in mid-summer to early fall when weather conditions are more stable. Decisions to allow these fires to burn are based on potential impacts to air quality and benefits to vegetation and other resource conditions.

Figure AQ-9. Number of Prescribed Fire Acres Accomplished by Montana/Idaho Airshed Group Members in 2001 and 2002 by Airshed



Dispersion Meteorology - Topography of the Ecogroup ranges from rolling foothills, to deep canyons, to steep rugged glaciated mountain peaks. The meteorology influenced by prevailing westerly winds affects the two distinctive climatic zones, Northern Rockies and the Snake River Plateaus (see the *Introduction*, Chapter 3). Some general meteorological information regarding smoke dispersion for the Ecogroup is described below.

The diverse nature of the terrain and climate can result in variable dispersion characteristics. Mountainous terrain can provide shelter from prevailing winds and severely limit wind in one area while funneling high winds into other areas. Temperature inversions, which trap pollutants, are common throughout the year, but the depth, duration, and intensity vary widely from the steep mountains to the deep canyons. Inversions on steep mountain slopes seldom persist past noon and usually become weaker with increasing altitude. Inversions in deep canyon areas are usually much stronger and can persist for several days during the fall and winter. Surface-level wind speed and direction patterns in the mountains are affected by terrain, and generalizations or comparisons to any existing measurements at other sites are impractical.

The impact of smoke at any sensitive area depends on the proximity of the fire use activities and the magnitude of the emissions. The greatest risk of smoke impacts occur when a sensitive area lies downwind and close to fire use activities. Daily heating and cooling, in combination with weather, influence the direction and dispersion of smoke. The farther away an area is from the fire, the less likely the impact. However, as the amount of emissions increases, the potential impact also increases. Large fires that produce a lot of emissions (such as uncharacteristic wildfire) can impact a much larger area than a smaller fire at the same location.

Seasonal mixing heights, upper level, mid-level, and surface trajectory winds were described by Ferguson (1998) for the ICBEMP area including the Ecogroup. Information from April, July, and October was used to provide a relative representation of spring, summer, and fall surface, upper level, and morning and afternoon mixing heights (Figures AQ-10, AQ-11, and AQ-12). Mixing height is a level in the atmosphere above which vertical exchange of air is inhibited. As such, average monthly mixing heights can be used to approximate the elevations at which pollutants will disperse downwind. Mixing heights at or below 500 meters (1,640 feet) indicate potentially stagnate air which traps pollutants (USDA Forest Service 1976). Morning and afternoon mixing heights by season for selected communities were used to determine potential risks of trapping smoke.

During summer, smoke emissions within the Snake River Plateaus experience consistently high mixing heights because the summer sun efficiently warms this inland area. Summer mixing heights for smoke emissions within the Northern Rockies are generally not as high, and mid-level winds prevailing from the northwest steer smoke emissions. The range of mixing heights varies in lower elevations, especially adjacent to Boise, where topographic constraints from the Snake River Valley are even more dominant than the overall basin topography. In the fall, mixing heights for smoke emissions are much lower than in spring, but not as low as in winter. They frequently drop to the lower range of the mid-level winds that prevail from the west to slightly northwest for both climatic zones. Upper-level winds are relatively strong, so smoke emissions higher in the atmosphere disperse within reasonably short distances downwind of the source. Slightly weaker mid-level winds allow smoke emissions to be carried somewhat farther downwind compared to upper-level winds. Smoke emissions in the spring are generally steered by upper-level winds that prevail from the west to slightly northwest within the Snake River Plateaus, and by mid-level winds for the Northern Rockies, which prevail from the northwest. Upper-level winds during the summer prevail from the southwest, steering smoke emission trajectories.

Alternatives to Burning and Emissions Reduction - Some of the criteria identified in the *Interim Policy* regarding conditions where mechanical treatments to reduce emissions would be feasible can be evaluated at the scale of this analysis. Of these, some do not change by alternative. This includes areas not designated as Wilderness, and areas with slopes equal to or less than 40 percent. The accessibility of an area is in part determined by Management Prescription Category assignments, which determine availability of roads and will vary by alternative. Therefore this criterion will be discussed in the Effects section. Terrain that is not excessively rough, and areas with Threatened and Endangered species, or cultural and paleological resources are too fine scale to consider in this analysis. These would be evaluated during project-level planning in areas that meet the other criteria for use of mechanical treatments.

Figure AQ-10. Thirty-Year Average Surface Winds for April

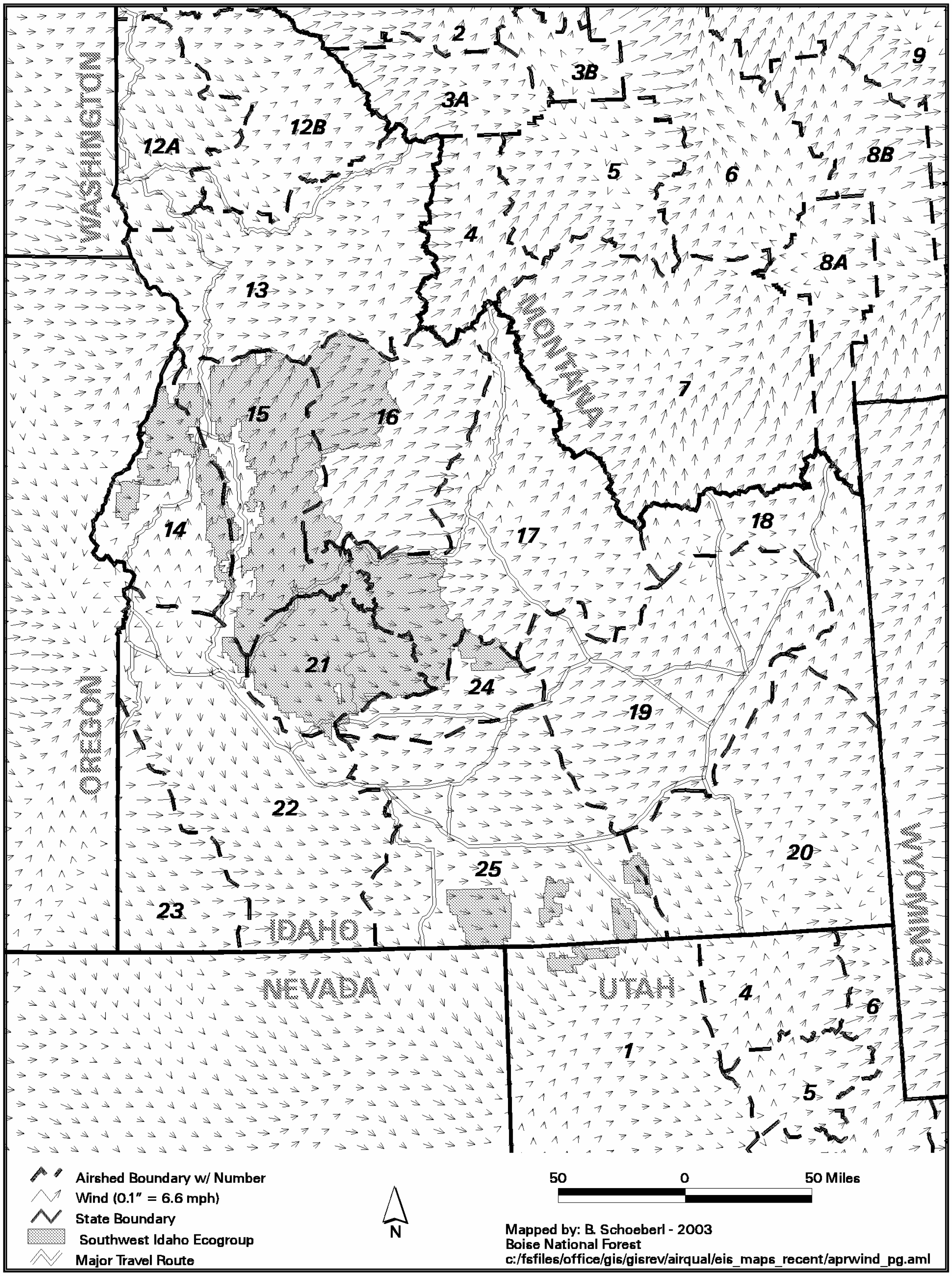


Figure AQ-11. Thirty-Year Average Surface Winds for July

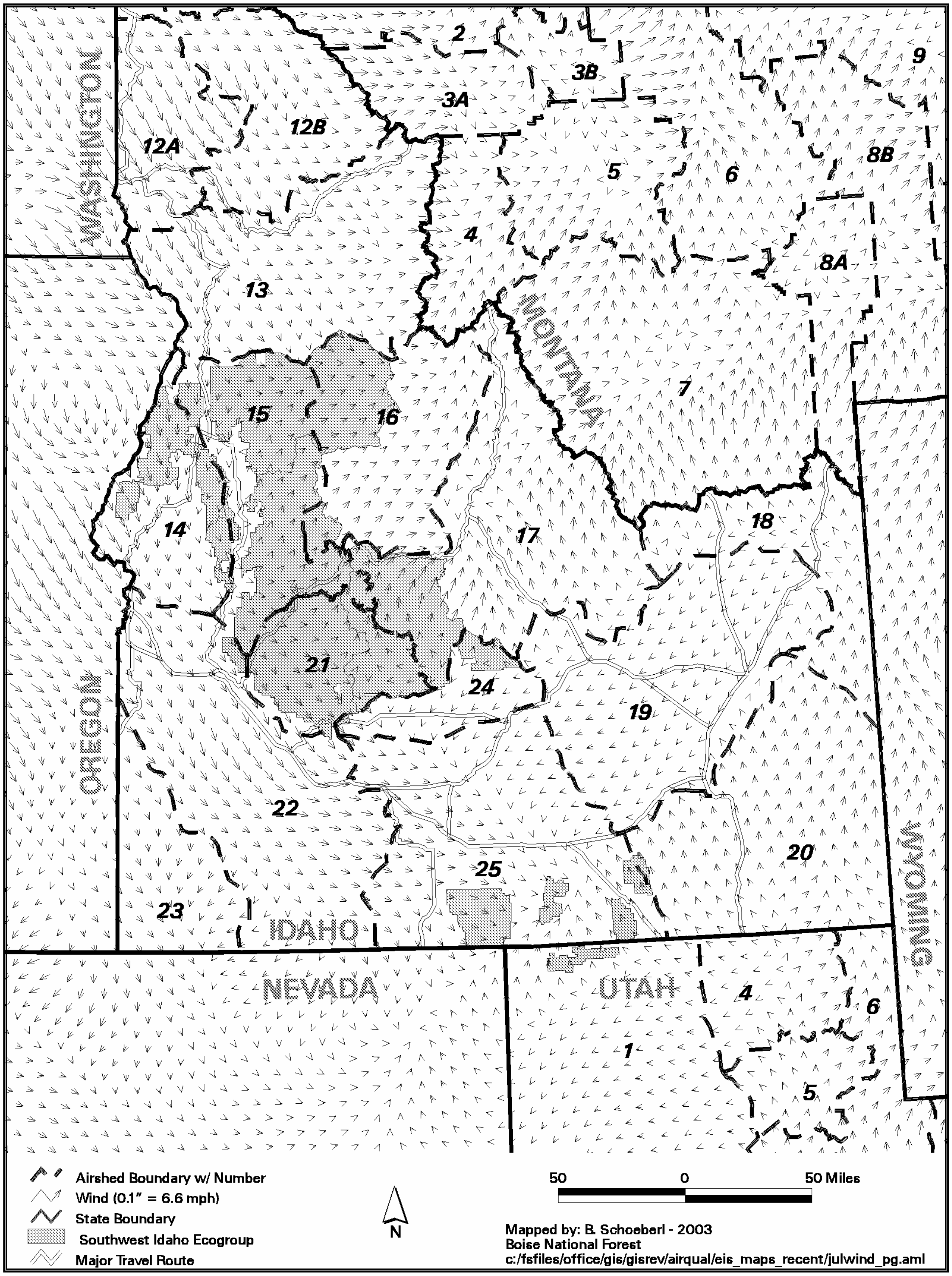


Figure AQ-12. Thirty-Year Average Surface Winds for October

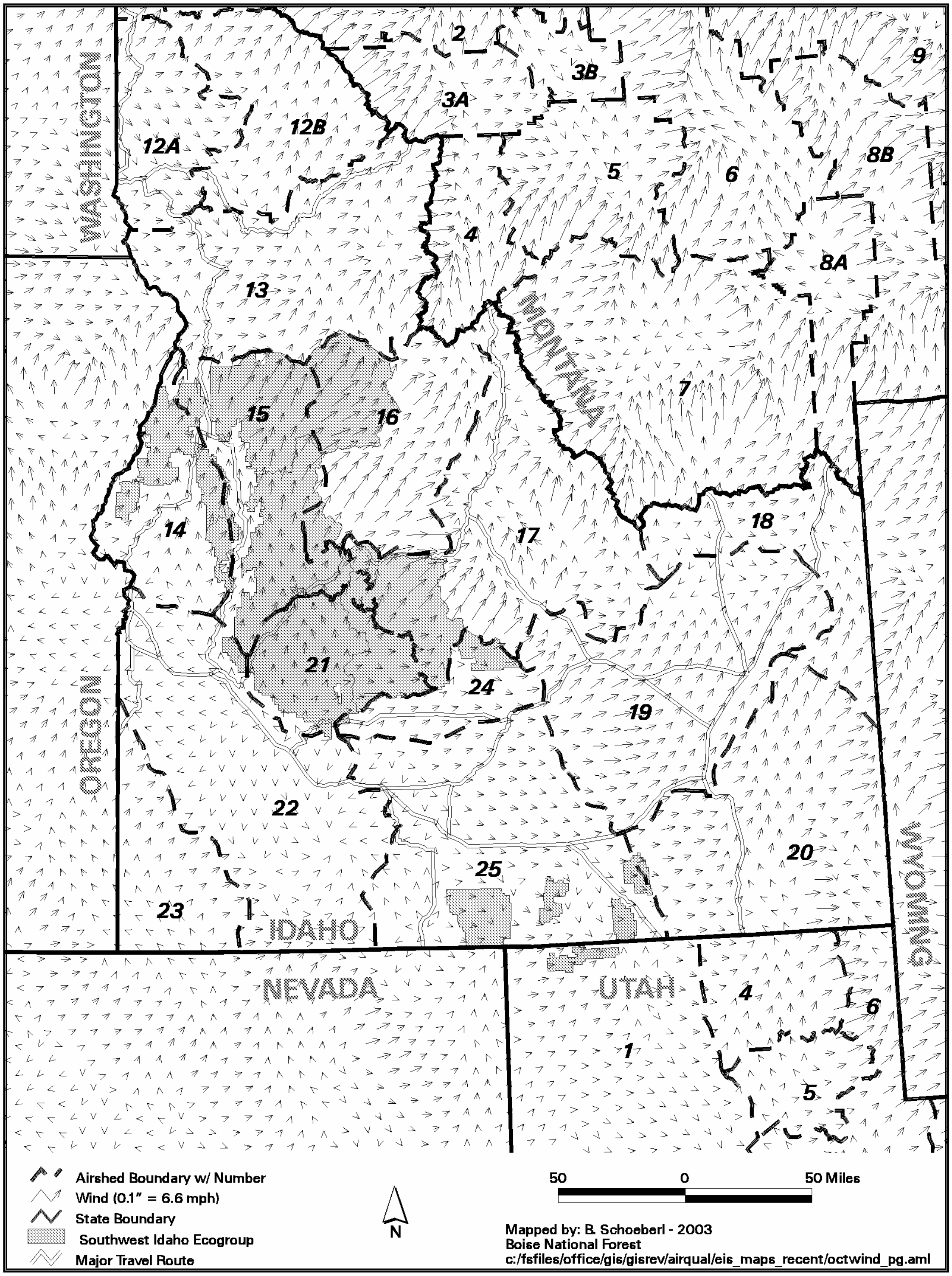


Table AQ-12 displays the percentage of each airshed administered by the Ecogroup that is in designated Wilderness, has slopes greater than 40 percent or slopes less than or equal to 40 percent. Opportunities for use of mechanical treatments on Ecogroup administered areas vary by airshed based on the amount of area with these various attributes. For example, the Ecogroup administers a large share (67 percent) of the acres in Airshed 16. However, 61 percent of these acres are in the Frank Church – River of No Return Wilderness. Much of Airshed 21 (80 percent) is administered by the Ecogroup but more than half of this (44 percent) is designated Wilderness or too steep for mechanical treatments. Airshed 15 has the most area that is Ecogroup administered lands with slopes amenable to mechanical treatments.

Table AQ-12. Percent of Airsheds Administered by the Ecogroup, Designated as Wilderness, with Slopes Greater than 40 Percent, and with Slopes Less Than or Equal to 40 Percent

Airshed[1]	Size of Airshed (Acres)	Percent of Airshed Administered by the Ecogroup	Percent of Airshed Ecogroup Acres Designated as Wilderness	Percent of Airshed Ecogroup Acres with Slopes greater than 40 percent	Percent of Airshed Ecogroup Acres with Slopes less than or equal to 40 percent
14	2,083,636	31	3	8	20
15	2,953,873	76	6	29	41
16	3,156,400	67	61	2	4
17	5,018,746	16	1	7	8
21	1,726,163	80	5	39	36
24	1,092,371	14	0	9	5
25	5,297,682	10	0	2	8
1	8,345,500	<1	0	<1	<1

[1]Airsheds 19 and 22 omitted from table due to the minor amounts of Ecogroup administered lands

Airshed Characterizations

Airshed 14

Description - This airshed is located in the northwest portion of the Ecogroup area. It covers over 2.0 million acres including portions of Hells Canyon, Brownlee Reservoir, and the Weiser and Payette River watersheds. Four counties are partially or wholly within the boundaries. These include Adams (75 percent), Washington (100 percent), Gem (58 percent), and Payette (48 percent). Appropriately 52 percent of the airshed is under Federal or State management. Of this 28 percent is managed by the Ecogroup, 18 percent is other Federal, and 6 percent is State.

Sensitive Areas -This airshed contains portions of the Hells Canyon Wilderness, which is a Class I area administered by the Wallowa-Whitman National Forest. There are no non-attainment, maintenance, or Impact Zones. There are several small communities that occur in the airshed including Cambridge, Council, Cuprum, Evergreen, Fruitvale, Midvale, Ola, Sweet, and Weiser. All of these communities are listed as “Urban Wildland Interface Communities” under the National Fire Plan.

Sources and Levels of PM 10 and PM 2.5 Emissions - Three of the four counties that occur in the airshed have lands administered by the Ecogroup. This includes Gem, Adams, and Washington. Gem County includes one point source that produces PM 10 or PM 2.5 levels above 100 tons per year. However, there are sources in an adjacent airshed (22) that contributed 33 percent of the total PM 2.5 emissions to this airshed. For all counties, Fugitive Dust made up the majority of the PM 10 emissions. Fugitive Dust was the primary emissions source for PM 2.5 in Payette and Washington Counties. In Adams County, Other Combustion contributed the most. In Gem County, Fugitive Dust and the point source were the primary contributors.

Of the three counties containing lands administered by the Ecogroup, Gem has the highest existing levels of PM 10 and PM 2.5. Gem ranks 18th for PM 10 and 17th for PM 2.5 relative to the other counties (TablesAQ-6 and AQ-7). PM 10 levels have been improving (going down), and PM 2.5 has shown slight improvement. Adams County ranks 26th for PM 10 and 20th for PM 2.5. PM 10 is improving slightly and PM 2.5 is constant. Washington County ranks 22nd for PM 10 and 25th for PM 2.5. PM 10 levels are improving and PM 2.5 is constant. For all three counties, Fugitive Dust is the primary contributor to PM 10 and PM 2.5 levels. Reductions of either are due to decreases in Fugitive Dust.

Payette County, which occurs in this airshed but does not contain Ecogroup administered lands, has emissions over 10,000 tons per year. This county ranks 12th for PM 10 and 19th for PM 2.5. Fugitive Dust is the primary contributor. As there are no managed lands within this county, Ecogroup activities would likely not contribute to PM 10 or PM 2.5 levels.

Agricultural Burning – The use of fire for crop residue disposal is relatively minor in this airshed. Counties that occur here have some of the lowest relative ranks of the counties in the area of consideration. Adams and Gem Counties rank very low and Washington and Payette Counties rank low (Table AQ-8). Counties in Oregon upwind of this airshed also contribute minor amounts.

Dispersion Potential and Transport – Average morning mixing heights for spring, summer, and fall indicate that residual smoke could be trapped until afternoon heating increased mixing heights around some communities in the airshed. Based on the proximity of National Forest Lands, residual smoke could affect Cuprum, Evergreen, Fruitvale, and potentially Council. However, in general, winds for spring and fall carry smoke away from most sensitive areas (Figures AQ-10, AQ-11, AQ-12). The exception is the Hells Canyon Wilderness in the fall; though surface winds carry smoke away from communities, the wind direction is toward the Wilderness. In the summer, surface winds shift and could transport smoke into the lower portions of river drainages, impacting the communities of Weiser, Cambridge, and Midvale. Upper level winds vary little in wind speed and direction during any season. Smoke lofted into upper level transport winds would generally be carried into Airshed 15, potentially impacting communities like McCall and Cascade that occur in valleys.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup are a mix of forested and non-forested. Thirty-eight percent of the area is forested nonlethal fire regimes (see the *Introduction* Table 3-2 and the *Fire Management* section for an explanation of fire regimes).

The same amount of area (38 percent) is forested mixed and lethal fire regimes. The remainder (24 percent) is in non-forested mixed fire regimes.

Airshed 15

Description - This airshed is located in the northern portion of the Ecogroup area. It covers over 2.9 million acres and includes all or parts of the following watersheds: Lower South Fork and Little Salmon River; North, South, and Middle Forks of the Payette; and a small portion of Boise-Mores. Four counties are partially within the boundaries. These include Adams (25 percent), Idaho (10 percent), Valley (61 percent), and Boise (61 percent). Appropriately 83 percent of the airshed is under Federal or State management. Of this 74 percent is managed by the Ecogroup, 5 percent is other Federal, and 4 percent is State.

Sensitive Areas - This airshed contains small portions of the Hells Canyon and Sawtooth Wildernesses both of which are Class I areas. The Wallowa-Whitman National Forest administers the Hells Canyon Wilderness, and the Sawtooth National Forest administers the Sawtooth Wilderness. There are no non-attainment or maintenance areas in this airshed. However, the McCall is identified as an Impact Zone. There are several communities, most of which are listed as "Urban Wildland Interface Communities" under the National Fire Plan. These include New Meadows, Warren, McCall, Lake Fork, Donnelly, Yellow Pine, Warm Lake, Cascade, Smiths Ferry, Banks, Crouch, Garden Valley, Lowman, Horseshoe Bend, Pioneerville, Placerville, Centerville, and New Centerville.

The McCall Impact Zone surrounds the community of McCall. In 2001 a PM 2.5 monitor was established in McCall. Preliminary data from 2001 indicates that air quality conditions (24-hour concentrations) during spring and fall burning seasons are in the "good" range for the Air Quality Index. In August of 2002, the McCall site recorded elevated levels of PM 2.5. Although it does not appear that an exceedance of the NAAQS occurred, the concentrations for PM 2.5 between August 19th and 21st were in the "moderate" to "unhealthy" Air Quality Index categories. The elevated levels were attributed to wildfires locally and smoke transported from Oregon along with stagnant weather conditions.

In addition, there is a monitoring site at the southern end of the airshed in Garden Valley. Data from 2001 showed patterns that were similar to McCall. Air quality levels would fall in the "good" range during spring and fall burning seasons. In 2002, air quality levels varied by season following the same pattern as that seen for McCall. PM 2.5 levels were lowest during the spring with one 24-hour spike reaching "moderate". During the summer, levels reached "moderate" in July and August most likely due to a local wildfire (the Garden Valley Complex).

Sources and Levels of PM 10 and PM 2.5 Emissions – All four counties in the airshed have lands administered by the Ecogroup. There are no point sources in any of the counties. Fugitive Dust makes up the majority of the PM 10 emissions followed by Other Combustion. For PM 2.5, Other Combustion makes up the majority followed by Fugitive Dust.

Idaho County has highest PM 10 emissions levels within the airshed and is the only one that has an annual average above 10,000 tons per year (Tables AQ-6 and AQ-7). This county ranks 5th for PM 10 and 2nd for PM 2.5. PM 10 trends are improving primarily from reductions in Fugitive

Dust as well as Other Combustion. PM 2.5 has shown no change over the past 5 years. Valley County ranks 14th for PM 10 and 6th for PM 2.5. As with Idaho County, the trends for PM 10 are improving. The improvement has been primarily from decreases in Fugitive Dust. However, the next largest contributor, Other Combustion, has been increasing. PM 2.5 has shown no change. Boise County ranks 23rd for PM 10 and 18th for PM 2.5. The trend is improving largely due to reductions in Fugitive Dust. Adams County ranks 26th for PM 10 and 20th for PM 2.5. PM 10 has shown slight improvement from reductions in Fugitive Dust. PM 2.5 emissions have shown no change.

Agricultural Burning – The use of fire for crop residue disposal is mostly low in this airshed. Adams, Valley, and Boise are all very low (Table AQ-8). Idaho County ranks moderate but most of the burning occurs to the north of the Ecogroup.

Dispersion Potential and Transport – Morning mixing heights vary for communities in the northern versus the southern portion of the airshed. Average morning mixing heights for spring, summer, and fall indicate that residual smoke could be trapped until afternoon heating increased mixing heights around many communities in the southern portion of the airshed. These include Cascade, Lake Fork, McCall, and New Meadows. Morning mixing heights in spring, summer, and fall for communities to the north, including Warm Lake, Warren, and Yellow Pine are higher, indicating that the risk of trapping residual smoke in the morning is lower.

In general, surface winds are favorable for transporting smoke away from sensitive areas in the airshed (Figures AQ-10, AQ-11, AQ-12). Wind directions in the western half of the airshed are north to south, and in the eastern half are south to north-northwest. In summer, wildfire or wildland fire use smoke would most likely be carried into Airshed 21, which lies to the south-southeast of Airshed 15. Smoke lofted into the upper level winds would most likely be transported to the east, primarily into Airshed 16 and 17.

From 1991 through 2000 this airshed averaged the greatest number of burning restrictions compared to the other airsheds with 22 per year. Forty-one of the restricted days occurred in 2000, a year in which numerous wildfires occurred in the airshed. All but one of the restrictions occurred for areas below 5,000 feet elevation. All were in the fall (October and November). This is generally the time of year coinciding with the burning season when mixing heights begin to decline.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup are primarily forested. Sixty-nine percent of the area is forested mixed and lethal fire regimes. Forested nonlethal fire regimes make up 23 percent. Non-forested mixed regimes account for 8 percent of the Ecogroup administered area.

Airshed 16

Description - This airshed is located in the northeast portion of the Ecogroup area. It covers over 3.1 million acres and includes in total or parts of the following watersheds: Upper and Lower Middle Fork of the Salmon River; Middle Salmon-Chamberlain; Middle Salmon – Panther and Upper Salmon; and a small portion of the South Fork Salmon. Four counties are partially within the boundaries. These include Idaho (8 percent), Custer (22 percent), Lemhi (38 percent), and Valley (37 percent). Appropriately 99 percent of the airshed is under Federal management. Of this the Ecogroup manages about 30 percent. Other Forests manage the remainder.

Sensitive Areas - This airshed contains no Impact Zones, or Class I, non-attainment, and maintenance areas. Big Creek is the only population center in the airshed.

Sources and Levels of PM 10 and PM 2.5 Emissions – All four counties in the airshed have lands administered by the Ecogroup as well as lands administered by the Salmon-Challis Forest. There are no point sources in any of the counties. Fugitive Dust makes up the majority of the PM 10 emissions followed by Other Combustion. For PM 2.5, Other combustion makes up the majority in Idaho and Valley Counties, and Fugitive Dust makes up the majority in Custer and Lemhi Counties.

Idaho County has highest PM 10 emissions levels within the airshed and is the only one that has an annual average above 10,000 tons per year (Tables AQ-6 and AQ-7). This county ranks 5^{th} for PM 10 and 2^{nd} for PM 2.5. PM 10 trends are improving primarily from reductions in Fugitive Dust as well as Other Combustion. PM 2.5 has shown no change over the past 5 years. Custer County PM 10 and PM 2.5 emissions are among the lowest in the area ranking 30^{th} for both PM 10 and PM 2.5. PM 10 is improving and PM 2.5 shows no change. PM 10 improvements are primarily the result of reductions in Fugitive Dust. Lemhi County ranks 27^{th} for PM 10 and 26^{th} for PM 2.5. PM 10 levels are improving and PM 2.5 shows slight improvement. Changes are the result of declines in Fugitive Dust. Valley County ranks 14^{th} for PM 10 and 6^{th} for PM 2.5. Trends for PM 10 are improving primarily from decreases in Fugitive Dust. However, the next largest contributor, Other Combustion, has been increasing. PM 2.5 has shown no change.

Agricultural Burning – The use of fire for crop residue disposal is mostly low in this airshed. Custer, Lemhi, and Valley County are all very low (Table AQ-8). Idaho County ranks moderate but most of the burning occurs to the north of the Ecogroup.

Dispersion Potential and Transport – Morning mixing heights in this airshed for spring, summer, and fall indicate residual smoke could be trapped until afternoon heating increased mixing heights.

In general, surface winds transport smoke in the same direction in all months, which would carry smoke away from sensitive areas (Figures AQ-10, AQ-11, and AQ-12). Wind speeds are lower in summer compared to spring and fall. Upper level winds would carry smoke lofted higher towards the east, into Airshed 17 in Idaho, or airsheds in Montana. Large events like wildfire or wildland fire use could impact Salmon, Idaho, which is an Impact Zone in Airshed 17, or areas within the Bitterroot Valley in Montana.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup are primarily forested. Sixty-two percent of the area is forested mixed and lethal fire regimes. Forested nonlethal fire regimes make up 29 percent. Non-forested mixed regimes account for 9 percent of the Ecogroup administered area.

Airshed 17

Description - This airshed is located in the eastern portion of the Ecogroup area. It covers over 5.0 million acres and includes in portions of several watersheds in the Upper and Middle Forks of the Salmon River, Big Wood River, and Lost River drainages. Five counties lie partially within the boundaries. These include Custer (72 percent), Blaine (21 percent), Lemhi (61 percent), Butte (33 percent), and Clark (11 percent). However, there are Ecogroup administered lands in only Custer and Blaine Counties. Appropriately 92 percent of the airshed is under Federal or State management. Of this 16 percent is managed by the Ecogroup, 74 percent is other Federal, and 2 percent is State.

Sensitive Areas – Portions of the Sawtooth Wilderness, which is a Class I area occur in this airshed. There are no non-attainment or maintenance areas. The airshed contains one Impact Zone around the community of Salmon, Idaho. There are several other small communities in the airshed including Stanley, Sunbeam, Clayton, Challis, Mackay, North Fork, and Leadore. All of these areas are listed as "Urban Wildland Interface Communities" under the National Fire Plan.

The Salmon Impact Zone surrounds the community of Salmon. This community, while not designated as a non-attainment area, has been a concern for particulate matter (PM 10). IDEQ has been monitoring PM 10 since 1990, but there has only been one exceedance, which occurred in 1997. Up until the summer of 2000, PM 10 levels in Salmon were on a downward trend, in part due to the loss of a local particulate matter source in the early 1990s. However, during the fire season of 2000, several instances were recorded in August that exceeded the 24-hour PM 10 standard. However, because these were from wildfire, these exceedances do not contribute towards designating this area as non-attainment because of EPA's Natural Events Policy. IDEQ prepared a Natural Events Action Plan to document that wildfires caused the exceedances. The IDEQ finalized their Wildfire Natural Events Action Plan in 2002. A total of eleven "excursions" were recorded during the fire season of 2000 with the highest 24-hour values reaching 281 micrograms per cubic meter (IDEQ undated), which rates as "unhealthy" based on the Air Quality Index. Wildfires on the Payette and Salmon-Challis National Forests were the main contributors to high PM 10 levels in Salmon.

Sources and Levels of PM 10 and PM 2.5 Emissions – There is only one point source for any of the counties that occur in the airshed in Butte County. However, it appears that it is outside the airshed boundary near Arco, Idaho, which is located in Airshed 19. It contributes approximately 5 tons per year of emissions, which is relatively minor. Fugitive Dust makes up the majority of the PM 10 and PM 2.5 emissions.

Blaine County ranks 18th for PM 10 and 16th for PM 2.5 (Table AQ-6 and AQ-7). Both particulate matters show improving trends. The reductions have been primarily from Fugitive Dust. Butte County ranks 33rd for PM 10 and 32nd for PM 2.5, which is among the lowest for this area. PM 10 levels have been improving and PM 2.5 has remained constant. Like with Blaine County, reductions in PM 10 have been from Fugitive Dust. Custer County ranks 30th for PM 10 and PM 2.5. PM 10 trends have been improving and PM 2.5 has remained constant. Again the change in PM 10 has been from Fugitive Dust. Lemhi County ranks 27th for PM 10 and 26th for PM 2.5. PM 10 shows improvement and PM 2.5 slight improvement.

Agricultural Burning – The use of fire for crop residue disposal is mostly low in this airshed. Custer, and Lemhi, Counties are all very low (Table AQ-8). Blaine, Butte, and Clark rank low.

Dispersion Potential and Transport – Average morning mixing heights for spring, summer, and fall indicate that residual smoke could be trapped until afternoon heating increased mixing heights around many communities in the airshed. These include Challis, Clayton, Leadore, North Fork, Salmon, and Stanley.

In general, surface winds for all seasons would carry smoke away from the Sawtooth Wilderness and population centers in the local vicinity (Figures AQ-10, AQ-11, and AQ-12). Surface winds are generally strong and wind speeds indicate good dispersion potential over most of the area except the Stanley Basin. Wind speeds are generally lower here. Surface winds in the spring are predominately westerly carrying smoke across the airshed. In summer and fall, surface winds surface winds move primarily south to north, or south to northeast. Smoke produced at the southern end of the airshed has potential to be carried toward the Sun Valley/Ketchum Impact Zone located in adjacent Airshed 24.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup are primarily forested. Eighty percent of the area is forested mixed and lethal fire regimes. Forested nonlethal fire regimes make up less than 1 percent of the area. Non-forested mixed regimes account for 20 percent.

Airshed 21

Description - This airshed is located in the central portion of the Ecogroup area. It covers over 1.7 million acres and includes most of the Boise River drainage. Four counties are partially within the boundaries. These include Ada (1 percent), Boise (29 percent), Camas (48 percent), and Elmore (52 percent). Appropriately 89 percent of the airshed is under Federal or State management. Of this the Ecogroup manages about 80 percent. Other Federal agencies manage 4 percent, and the State 5 percent.

Sensitive Areas - This airshed contains small portions of the Sawtooth Wilderness, which is a Class I area. The Sawtooth National Forest administers the Sawtooth Wilderness. There are no non-attainment, maintenance areas, or Impact Zones in this airshed. There are several communities, most of which are listed as "Urban Wildland Interface Communities" under the National Fire Plan. These include Idaho City, Atlanta, Rocky Bar, Featherville, Prairie, and Pine.

Sources and Levels of PM 10 and PM 2.5 Emissions – All four counties in the airshed have lands administered by the Ecogroup though the amount of area in Ada County is minor.

Elmore County is the only county with point sources. However, the amount contributed is less than 100 tons per year. Fugitive Dust makes up the majority of the PM 10 emissions in Boise and Elmore Counties. In Camas County, the primary contributor is Other Combustion. For PM 2.5, Other Combustion makes up the majority of the emissions in Boise and Camas Counties. Fugitive Dust followed by Agriculture and Forestry combined comprise the majority.

Boise County ranks 23rd for PM 10 and 18th for PM 2.5 (Tables AQ-6 and AQ-7). Boise has the lowest emissions of the three counties that make up the majority of the area in the airshed. PM 10 trend is improving, primarily from reductions in Fugitive Dust. PM 2.5 trends have not changed. Camas County ranks 24th for PM 10 and 9th for PM 2.5. Trends for both emissions are improving. The ranking of this county, particularly for PM 2.5, was caused by a single year spike in particulate emissions in 1996, likely from wildfires. Elmore County ranks 15th for PM 10 and 17th for PM 2.5. PM 10 levels have been improving while PM 2.5 has been constant. The improvement in PM 10 has been due to declines in Fugitive Dust.

Agricultural Burning – The use of fire for crop residue disposal is mostly low in this airshed. Boise ranks very low, Camas low, and Elmore moderately low (Table AQ-8).

Dispersion Potential and Transport – Average morning mixing heights for spring, summer, and fall indicate that residual smoke could be trapped until afternoon heating increased mixing heights around many communities in the airshed. These include Atlanta, Featherville, Idaho City, Pine, and Prairie. However, morning mixing heights in all seasons are generally good in some areas including Rocky Bar.

Surface wind speeds and direction vary greatly for this airshed and are difficult to generalize (Figures AQ-10, AQ-11, and AQ-12). On the Boise Forest, surface winds for April and October more often carry smoke away from the majority of sensitive areas located in the western half of the airshed and nearby population centers in Airshed 15. However, smoke would potentially be carried toward the Class I area. In July, smoke could potentially be carried north-northwest into Airsheds 17 and 16. On the Sawtooth Forest, smoke produced in April and October could be carried toward the Sun Valley/Ketchum Impact Zones located in Airshed 24, which is to the east of this airshed. Smoke lofted high enough to be transported by upper level winds would be carried into adjacent airsheds to the east.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup are a mix of forested and non-forested. Forty-two percent of the area is forested mixed and lethal fire regimes. Forested nonlethal fire regimes make up 25 percent. Non-forested mixed regimes account for 33 percent of the Ecogroup administered area.

<u>Airshed 24</u>

Description - This airshed is located south and east of the contiguous portions of the Ecogroup area. It is the smallest of the South Idaho Airsheds covering about 1.0 million acres. It includes portions of the Camas Creek, and Little Wood and Big Wood River drainages. Three counties are partially within the boundaries. These include Blaine (40 percent), Camas (49 percent), and Elmore (3 percent). Appropriately 56 percent of the airshed is under Federal or State management. Of this the Ecogroup manages about 14 percent. Other Federal agencies manage 36 percent, and the State manages 6 percent.

Sensitive Areas - This airshed contains no Class I areas. However, Craters of the Moon National Monument lies to the east in Airshed 19. There are non-attainment or maintenance areas. There is an Impact Zone that includes the communities of Sun Valley, Ketchum, Hailey, and Bellevue. There are other small communities in the airshed including Bellevue, Fairfield, and Hill City. All these areas are listed as "Urban Wildland Interface Communities" under the National Fire Plan.

At this time, the Sun Valley/Ketchum Impact Zone does not have an ambient air monitor for particulate matter or other criteria pollutants. However, IDEQ did have an ambient air monitor for PM 10 in Ketchum from 1995 to 1998 (IDEQ March 2001). No exceedances were recorded during that period. During the four-year period, maximum values were recorded twice in March, and once in July and February. The second highest values recorded occurred during the winter months between December and February, with one in June. The highest 24-hour value occurred in 1998, but was characterized in the "moderate" range for the Air Quality Index.

Sources and Levels of PM 10 and PM 2.5 Emissions – Elmore County makes up only a small portion of the airshed and will not be discussed here. The other two counties contain only minor amounts of Ecogroup managed lands, particularly Camas County. There are no point sources in these two counties.

Blaine County ranks 18th for PM 10 and 16th for PM 2.5 (Tables AQ-6 and AQ-7). Fugitive Dust makes up the majority of the both emissions, which are showing improving trends, primarily from reductions in Fugitive Dust. Camas County ranks 24th for PM 10 and 9th for PM 2.5. Other Combustion is the primary contributor to both particulate matters. The ranking of this county, particularly for PM 2.5, was caused by a single year spike in particulate emissions in 1996, likely from wildfires.

Agricultural Burning – The use of fire for crop residue disposal is mostly low in this airshed. Blaine and Camas Counties rank low, and Elmore ranks moderately low (Table AQ-8).

Dispersion Potential and Transport – Average morning mixing heights for spring, summer, and fall indicate that residual smoke could be trapped until afternoon heating increased mixing heights around some communities in the airshed. Morning mixing height in spring, summer, and fall are generally poor for Fairfield, Ketchum, and Sun Valley. Around Hailey mixing heights are above the stagnation level in the spring, and below in summer and fall. Average morning mixing heights in all seasons are good for Bellevue and Hill City.

In general, surface winds for April are the strongest and would carry smoke toward the east, potentially impacting the Craters of the Moon National Monument, the Class I area in Airshed 19 (Figures AQ-10, AQ-11, and AQ-12). Surface winds in July shift to the opposite direction and would transport smoke to the west. During this season, smoke not lofted into the upper levels could be transported into population centers in the airshed. Wind speeds are also low during July, which indicates smoke would not be transported far within or outside of the airshed. Surface winds shift again in October, potentially carrying smoke to the east, but slightly more east-southeast than the spring months. Smoke lofted into the upper level winds would be carried eastward toward Craters of the Moon but away from population centers in the airshed.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup are a mix of forested and non-forested. Fifty-one percent of the area is non-forested mixed fire regimes.

Forested mixed2 and lethal fire regimes make up 44 percent. Forested nonlethal regimes account for only 5 percent.

Airsheds 20, 25, and 1

Description - These airsheds cover the southern portion of the Ecogroup area and contain the southern Divisions of the Sawtooth Forest. Most of the Divisions occur in Airshed 25. Part of the Sublett Division occurs in Airshed 20. Airshed 1 contains the Raft River Division of the Sawtooth Forest. In total these airsheds cover 18.5 million acres. Of this 8.3 million is Airshed 1, 5.3 is Airshed 25, and 4.9 million is Airshed 20. This area covers portions of several watersheds including Lake Walcott, Raft River, Goose Creek, Upper Snake-Rock, Salmon Falls, and Curlew Valley. There are also portions of several counties in each airshed. Airshed 25 contains parts of Twin Falls (89 percent), Gooding (100 percent), Cassia (99 percent), Jerome (100 percent), Minidoka (83 percent), and Lincoln (99 percent). Airshed 20 has Oneida (85 percent), Power (56 percent), Franklin (100 percent), and a portion of Bannock. Airshed 1 is mostly Box Elder County (81 percent). The Ecogroup manages 10 percent of the area in these three airsheds. Other Federal, primarily Bureau of Land Management manages 47 percent. Three percent is managed by the State.

Sensitive Areas - There are no Class I areas in any of the airsheds. There are two non-attainment areas, the Portneuf Valley PM 10 and the Fort Hall PM 10, and no maintenance areas. There are also two Impact Zones. The Twin Falls Impact Zone is within Airshed 25 and the southern tip of the Pocatello Impact Zone is in Airshed 20. This area includes the Portneuf Valley PM 10 Non-attainment Area described above. There are also several population centers including Gooding, Heyburn, Burley, Elba, Declo, Albion, Malta, Oakley, Almo, Shoshone, Dietrich, Rockland, Fort Hall Reservation, Preston, Yost, Clear Creek, and Park Valley. All of these communities are listed as “Urban Wildland Interface Communities” under the National Fire Plan.

Twin Falls Impact Zone surrounds the Twin Falls area. From 1995 to 1998 no exceedances were recorded; the annual average over this timeframe remained below 25 micrograms per cubic meter. Peak concentrations over a 24-hour period would be characterized as “good” to “moderate” based on the Air Quality Index. This monitoring location, unlike other monitoring sites in other impact zones, showed more peak concentrations occurring in spring and fall months in addition to winter months.

Sources and Levels of PM10 and PM 2.5 Emissions - Only the counties with lands administered by the Sawtooth are discussed in detail in this section. These include Twin Falls and Cassia in Airshed 25, Power and Oneida Counties that border Airsheds 25 and 20; and Box Elder in Airshed 1.

Several counties within the three airsheds have point sources that produce over 100 tons per year of PM 10 and PM2.5. Of these, three have lands administered by the Sawtooth Forest. They include Twin Falls, Power, and Box Elder Counties. Point sources in Twin Falls County are located near the community of Twin Falls, but contribute relatively low amounts to the total PM 10 and PM 2.5 annual emissions. Point sources in Power County contribute the greatest amount of particulate matter. However these sources are located near Pocatello. Box Elder County in

Utah also has point sources that contribute to particulate matter emissions. Approximately 7 percent of the PM 10 and 22 percent of PM 2.5 annual emissions are from these points sources. However these sources are not close to the Raft River Division.

For most of the counties with Ecogroup Forest lands, the majority of the PM 10 emissions are from Fugitive Dust. One exception is Power County where Agriculture and Forestry, and Fugitive Dust together make up the majority. For PM 2.5, the majority for all but two counties is also Fugitive Dust. Here, the exceptions are Cassia County where Fugitive Dust, and Agriculture and Forestry make up the majority. In Power County, point sources comprise the majority of the emissions.

Twin Falls County ranks 4th for PM 10 and 5th for PM 2.5 (Tables AQ-6 and AQ-7). This is among the highest of all the counties over the Ecogroup. PM 10 trends are improving and PM 2.5 improving slightly. Cassia ranks 8th for PM 10 and 13th for PM 2.5. Trends for PM 10 are improving; PM 2.5 shows no change. Power ranks 19th for PM 10 and 12th for PM 2.5. PM 10 levels show slight improvement and PM 2.5 is constant. Oneida ranks 28th for PM 10 and 29th for PM 2.5. Pm 10 levels are improving and PM 2.5 improving slightly. Box Elder ranks 9th for PM 10 and 10th for PM 2.5. Neither PM 10 nor PM 2.5 levels have changed. Trends for PM 10 in the five counties with Ecogroup lands have mostly been improving. Box Elder shows no change in emissions levels. Improvements in emissions trends in the Idaho counties are primarily due to reductions in the annual amounts from Fugitive Dust.

Agricultural Burning – The counties in these airsheds have the highest levels of burning for crop residue disposal though some of the counties rank low (Table AQ-8). These include Gooding and Lincoln. Franklin, Jerome, and Box Elder rank moderately low. Minidoka and Oneida rank moderate and Twin Falls ranks moderately high. Cassia and Power are high.

Dispersion Potential and Transport – Average morning mixing heights for spring, summer, and fall indicate that residual smoke could be trapped until afternoon heating increased mixing heights around some communities in the airshed. Morning mixing height in spring, summer, and fall are generally poor for Burley, Dietrich, Malta, Oakley, and Twin Falls. Around Declo mixing heights are above the stagnation level in the spring, and below in summer and fall. Average morning mixing heights in all seasons are good for Albion, Almo, and Elba.

The Snake River Plain dominates a large portion of Airshed 25. Surface winds in April are relatively strong and would carry smoke across the airshed in an easterly direction potentially impacting the Craters of the Moon National Monument (Figures AQ-10, AQ-11, and AQ-12). Over the South Hills Units, however, the wind speeds are slightly less and smoke would carry predominately in a southeasterly direction towards Airshed 1. During July wind speeds drop. The wind in the west half of the airshed continues to travel in an easterly direction. Surface winds over the South Hills Units are more complex in wind speed and direction. Surface winds over the Cassia Division could carry smoke back towards population centers in Airshed 25. In October the surface wind direction pattern is similar to spring, but wind speeds are less. The units on the border of Airsheds 25 and 20 would most likely have smoke transported easterly into Airshed 20. The relatively slow wind speeds in the valley bottoms suggest poorer transport away from population centers within Airshed 25. Upper level wind speed and direction vary little in the representative months. Smoke columns lofted into the upper level winds would be transported to the east primarily into Airsheds 20 and 19.

Fire Regimes - Vegetative communities on lands administered by the Ecogroup Forests are primarily non-forested including sagebrush and pinyon-juniper communities. These mixed2 to lethal fire regimes account for 79 percent of the area administered by the Ecogroup. Climax aspen, which is a lethal fire regime, makes up 5 percent. Forested mixed and lethal fire regimes make up 17 percent.

Southwest Idaho Ecogroup Historical Versus Current Smoke Emissions

Levels of smoke declined as fire was excluded from forests, particularly after the advent of organized fire suppression in the late 1930s. Wildfires today tend to produce higher levels of smoke emissions than they did historically due to an increase in fuel loadings and stand densities. Brown and Bradshaw (1994) found the emissions are greater from wildfires today, even when they burn fewer acres than historical fires, because consumption of fuel per unit burned has been greater in current times.

Historically (pre-settlement), about 1.6 million acres per decade may have burned over the Ecogroup in the forested and non-forested communities (Figure AQ-13). This is about 28 percent of the total Ecogroup acres (Table AQ-13). This amount of burning was estimated to produce about 225,500 tons of PM 2.5 (266,000 tons of PM 10) per decade. Of this, more than half of the estimated emissions (63 percent) came from the nonlethal fire regimes in the forested communities (Fire Regime I) while the smallest amount (1 percent) was from the non-forested areas (Fire Regimes II or IV) (Table AQ-13).

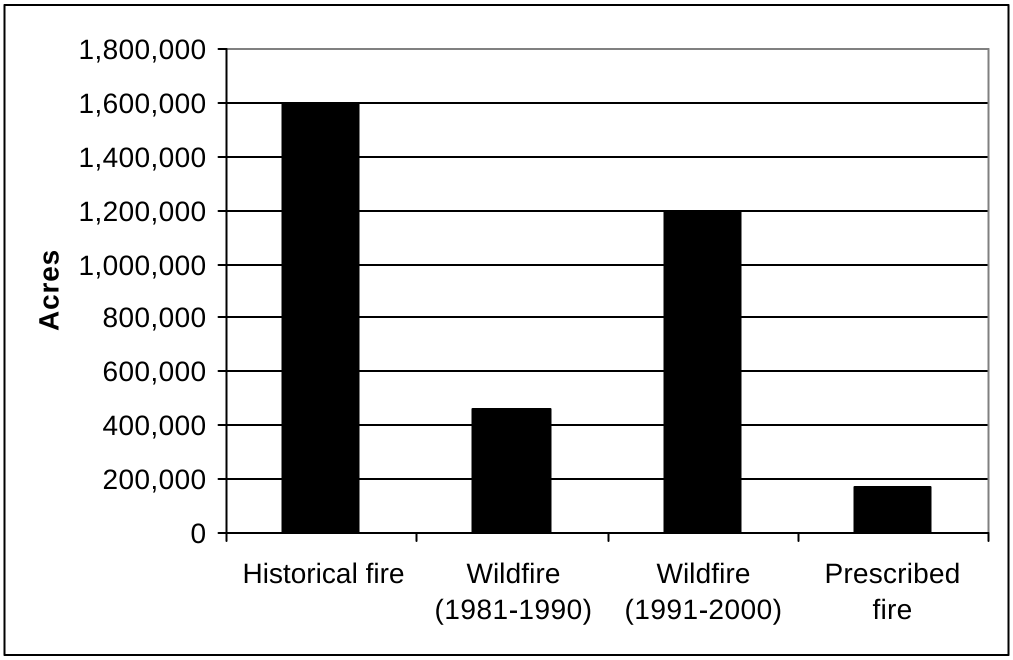
Table AQ-13. Estimated Percentage of Total Historical Acres Burned and Emissions Produced by Fire Regime

Fire Regime	Percentage of total Ecogroup acres estimated to have burned each decade	Percentage of total estimated emissions produced from burned acres
I (forested, nonlethal)	13	63
III or V (forested, mixed or lethal)	9	36
II or IV (non-forested, mixed or lethal)	6	1
Total	28	100

From 1995 through 1999, on the average about 16,000 acres per year was burned using prescribed fire (Table AQ-11). This rate of burning equates to approximately 160,000 acres or three percent of the total Ecogroup acres per decade (Figure AQ-13). Smoke produced from fire use, particularly prescribed fire, generally disperses quickly as these fires are conducted when meteorological conditions are best for mixing and dispersal.

Approximately 1,200,000 acres were burned by wildfire from 1991 through 2000; the previous decade burned about 460,000 acres (Figure AQ-13). This amounts to about 21 percent of the total acres in the Ecogroup over the most recent decade and 8 percent over the previous decade. Currently, about 48 percent of the forested acres and 23 percent of the non-forested are in a condition that could contribute to large, uncharacteristic wildfires like some of those experienced in the past two decades (see the *Vegetation Hazard* section, Tables VH-3 and VH-6).

Figure AQ-13. Acres Burned per Decade in the Southwest Idaho Ecogroup Historically and by Wildfire and Prescribed Fire



ENVIRONMENTAL CONSEQUENCES

Methodology and Assumptions

__Emissions Levels and Characteristics__

Ecogroup Fire Use Treatments and Effects - Combinations of Management Prescription Categories (MPCs) and Potential Vegetation Groups (PVGs) define fire use treatments. Therefore, an MPC and PVG combination applied from one alternative to another assumes the same kind of fire use and emissions. Treatment of activity fuels is a ratio of the acres treated mechanically to the acres treated with fire to reduce activity fuels. What varies between the alternatives is the number of acres treated directly with fire or mechanically to achieve desired conditions and other goals.

Smoke Modeling Variables - Fuel loading estimates, consumption ratios, and emission factors were assigned to combinations of PVGs based on similar vegetation types and types of fire. The types of fire included wildland fire use, prescribed fire used to achieve vegetative desired conditions and to treat fuels generated from mechanical activities, and wildfire. Variables for the different types were compiled from a variety of references. This information was used to develop a smoke model that estimated emissions from the various sources for each alternative. Fuel loadings, consumption factors, emission factors, and conversion ratios were the same for all alternatives. Smoke emissions varied between alternatives based on the number of acres treated from different smoke sources.

Risks to Sensitive Areas - Season, frequency, duration, and magnitude (amount of emissions) determine the potential effects of smoke at sensitive areas. Project-level analysis generally evaluates duration and magnitude. At the scale of this programmatic analysis, season and frequency are also important considerations since the effects of implementing alternatives to achieve desired conditions occurs over the temporary, short, and long-term.

Season is defined as the time of year when certain types of fire activities generally take place across the Ecogroup (Table AQ-14). While the actual timing of activities depends on prescription windows that vary year to year depending on weather and other factors, fire use activities most often occur from spring to early fall. Windows for prescribed fire usually occur in the spring and again in the fall. Lightning ignites fires that may be implemented for wildland fire use; in the Ecogroup lightning ignitions that result in a fire are most common in July and August (Rorig and Ferguson 2002). This is the same time period that wildfires occur. However, human-caused ignitions can create a wildfire season that starts earlier and/or lasts longer than the wildland fire use season. The typical season of various types of fire can indicate possible conflicts with activities that also have a generalized season such as agricultural burning or big-game hunting. Ambient air monitoring sites in Idaho, especially in the non-attainment areas, show that the incidence of elevated concentrations most often occurs in the winter. This is correlated with the inversions that more often develop in the winter than during other times of the year. These inversions can last several days to several weeks.

Table AQ-14. Summary of Relative Seasonality, Frequency, Duration and Magnitude from Fire Use and Wildfires

Type of Fire	Season (Spring, Summer, Fall, Winter)	Frequency (Annually or decadal)	Duration (Days, weeks, months)	Magnitude (Size of Area Burned)
Prescribed fire for treatment of activity fuels	Primarily Fall	Annually	Days to weeks	5 to 40 acres
Prescribed fire for treatments other than activity fuels	Spring, Fall	Annually	Days to weeks	10 to 1000's of acres
Wildland Fire Use	Summer, early Fall	Variable depending on weather, etc. (only for FCRONR and	Days to weeks	10 to 10,000's of acres

Type of Fire	Season (Spring, Summer, Fall, Winter)	Frequency (Annually or decadal)	Duration (Days, weeks, months)	Magnitude (Size of Area Burned)
		Sawtooth Wilderness areas)		
Wildfire	Summer, early Fall	Wildfires occur annually. Large events occurring more frequently within decadal periods	During large wildfire events like in 1992, 1994, 2000 can be weeks to months	Majority of wildfires are less than 100 acres. Events greater than 10,000 acres with some single wildfires greater than 100,000 acres.

Frequency indicates how often certain types of fire activities usually take place (Table AQ-14). Prescribed fire, whether for treatment of activity fuels or to meet other objectives, usually takes place each year, though unusual circumstances, such as the fire use moratorium in 2000, can occur. Implementation of wildland fire use is much less predictable as it depends on a lightning ignition and a host of other factors including location, expected size and extent, effects, personnel available to manage the ignition, and air quality, all of which are too variable to predict. The same is true for wildfire. While wildfires occur annually, (see Table VH-7 in *Vegetation Hazard*), very large wildfires like those that occurred in 1992, 1994, and 2000 occur less predictably.

Risk to sensitive areas increases with frequent fire use particularly if the magnitude of the emissions have the potential to contribute to an exceedance of the daily or annual NAAQS. Vegetative communities were used to determine the potential for frequent fire use adjacent to or in close proximity to a sensitive area (Figures AQ-14 and AQ-15). We assumed that vegetative communities in the nonlethal fire regimes (Fire Regime I) would be targeted most often for burning. The lethal fire regimes (Fire Regime V) would be targeted for burning much less frequently. The National Fire Plan Fire Regimes were used to classify the vegetative communities and are defined as follows (see the *Introduction* and *Fire Management* sections for more detail regarding fire regimes):

I—Forested vegetation, nonlethal
II—Non-forested vegetation, mixed2 (includes small amounts of mixed1)
III—Forested vegetation, mixed1and mixed2
IV—Non-forested vegetation, lethal
V—Forested vegetation, lethal.

Duration indicates how long smoke may be expected to occur from the different types of fire (Table AQ-14). This is not the expected duration of any one fire use or wildfire, but rather is the typical length of time smoke might be present from that type of fire activity. However, in some cases such as with wildfire, the duration may be from one single event that burns for a long time period. For prescribed fire, the duration indicated represents the burning window that most often occurs, during which several prescribed fires may be ignited.

Magnitude is the amount of emissions produced using potential fire size as an indicator (Table AQ-14). Generally, the more area burned, the greater the emissions. While all fire types are a similar size at the low end, activity fuel treatments represent the lowest end of potential emissions and large wildfires the highest end. We assumed that wildland fire use would fall intermediate to these two with wildland fire use implementation generally resulting in more acres burned than prescribed fire.

Population Centers - Several factors were used to evaluate the risk of smoke impacts to the various sensitive areas. Table AQ-15 and AQ-16 show the factors used to evaluate the risk of direct, indirect, and cumulative effects to population centers.

Table AQ-15. Qualitative Factors Considered to Evaluate the Risk of Direct and Indirect Effects from Smoke to Population Centers

Factors Considered	Indicates Increasing Potential or Relative Risk of Smoke-related Concerns	Type of Potential Impact and Rationale
Number of Ecogroup Forests within the same Airshed	Percent of airshed shared in about equal proportions when Ecogroup Forests occupy the majority of the airshed	Smoke accumulation from multiple burners (Ecogroup Forests) within the same airshed
Percent of Ecogroup administered lands within county	Relatively higher amounts of administered land: in particular, relatively higher amounts of Fire Regime I (forested, nonlethal), and II (non-forested, mixed and lethal)	Potential to cause a direct impact through increased emissions
Surface and upper level (850 mb) wind direction for representative seasons	Population centers potentially downwind of fire use	Increased likelihood of a smoke impacts at population centers
Potential proximity of burn to population centers (including Non-attainment/ Maintenance Areas)	Relative relationship of Fire Regime I (forested, nonlethal) and Fire Regime II (non-forested, mixed and lethal) to population centers in the airshed	Potential for more frequent burning in these vegetation types which increases the potential for smoke impacts
Seasonality (spring, summer, fall, winter)	Season(s) with poorer dispersion	Increases potential for smoke impacts due to unfavorable dispersion characteristics
Peak 24-hour Air Quality Indexes[1] and season of occurrence	Pattern of peak 24-hour values during fire use seasons (spring and fall for prescribed fire, summer for wildland fire use)	Could contribute to existing periods or levels of high ambient air concentrations

[1]From existing ambient air monitoring data when available for population centers. Peak values are first and second highest recorded PM 10 concentrations from IDEQ's 1998 Monitoring Report (March 2001)

Table AQ-16. Qualitative Factors Considered to Evaluate the Risk of Cumulative Effects from Smoke to Population Centers

Factors Considered for:	Indicates Increasing Potential or Relative Risk of Smoke-related Concerns	Type of Potential Impact and Rationale
Additional burning conducted by Airshed Group members	Percentage of airshed shared with member burners other than the Ecogroup when other members manage more or about equal amounts of the airshed[1]	Smoke accumulations from non-Ecogroup airshed members burning within the same window in the same geographical area
Additional Burning conducted by burners who are not Airshed Group members	Relative amounts (and season) of agricultural related burning within county and/or within airshed	Smoke accumulations from multiple burners
5-year Annual Average Trend (1995-1999)	Increasing trend in PM 10 and/or PM 2.5	Greater likelihood of conflict if fire use increases
Relative rank and/or total annual average emissions of particulate matter	High overall total emissions and/or already designated as Non-attainment/Maintenance Area	Increases in the amount of fire use over current may contribute to already high PM 10 or PM 2.5 levels
Presence or Absence and proximity of point sources	Presence of major point sources (greater than 100 tons per year)	Increases in the amount of fire use may contribute or compound air quality levels in combination with point sources that emit pollutants daily

[1]Though other land management agencies participate in smoke management programs for forest and rangeland burning to prevent exceedances of the NAAQS, smoke related impacts or accumulations may still occur

Class I Areas – The assessment of potential risks of smoke related impacts to Class I areas is much simpler. The risk of impacts of smoke to visibility was based on potential for smoke intrusions. Where Class I areas occurred within airsheds adjacent to or surrounded by Ecogroup administered lands (i.e. Hells Canyon and Sawtooth Wildernesses), surface winds were used to evaluate the potential risk of smoke impacts from Ecogroup fire use activities (Table AQ-17). For Class I areas within the area of consideration, upper level winds were used to evaluate potential direct/indirect effects from Ecogroup fire use activities. A direct effect was considered a potential impact from Ecogroup activities only rather than the potential impacts from Ecogroup activities in combination with other sources.

Cumulative effects were evaluated using seasonality. In general, the winter months (December, January, February) result in the best visibility (least impairment) (Malm et al. 2000, US EPA 2001). Other times of the year coincide with the fire use or wildfire “season” (Table AQ-14). Prescribed burning primarily occurs during the spring and fall. Wildland fire use would more often occur in the summer into the early fall.

Figure AQ-14. Historical Fire Regimes for the Northern Portion of the Ecogroup

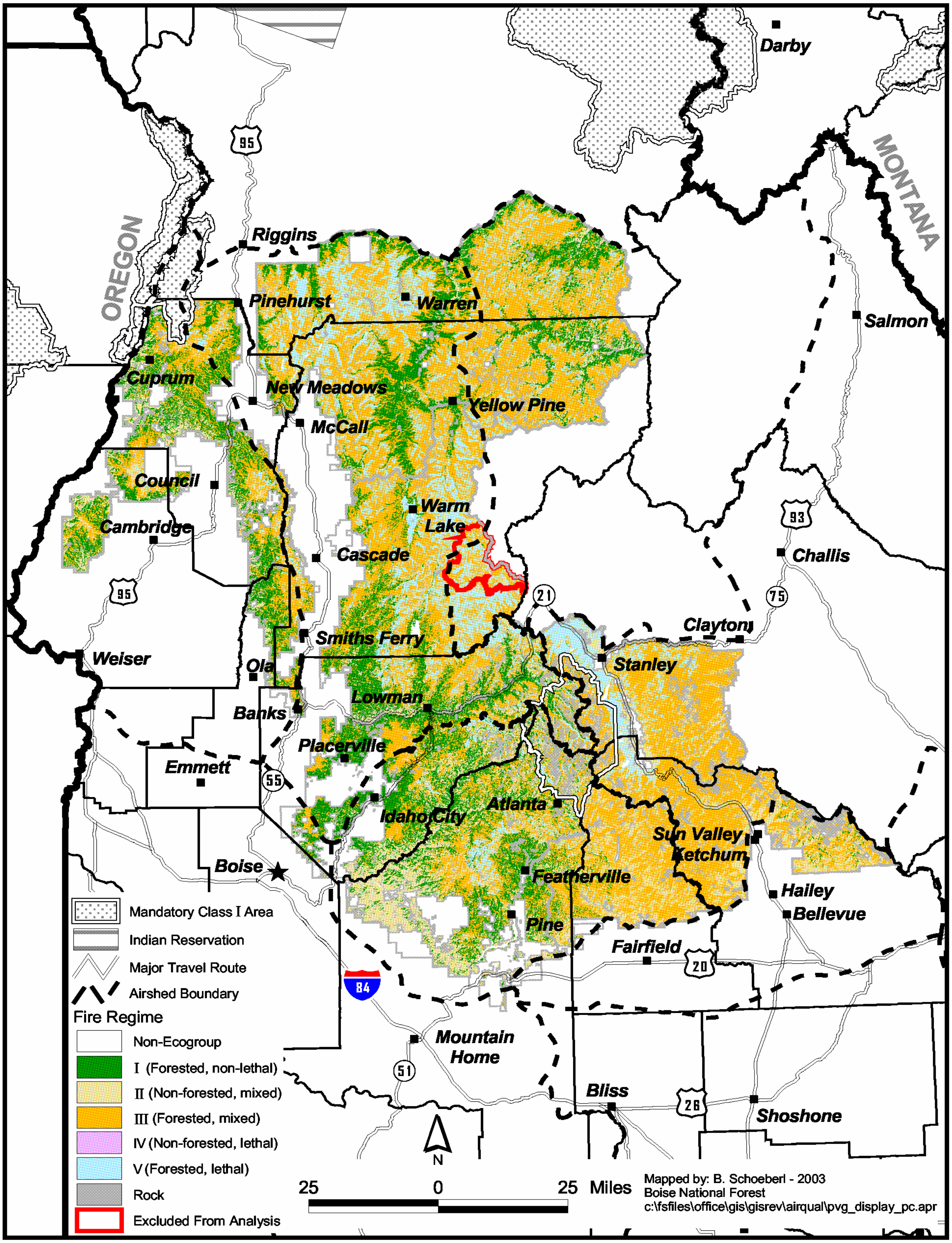


Figure AQ-15. Historical Fire Regimes for the Southern Portion of the Ecogroup

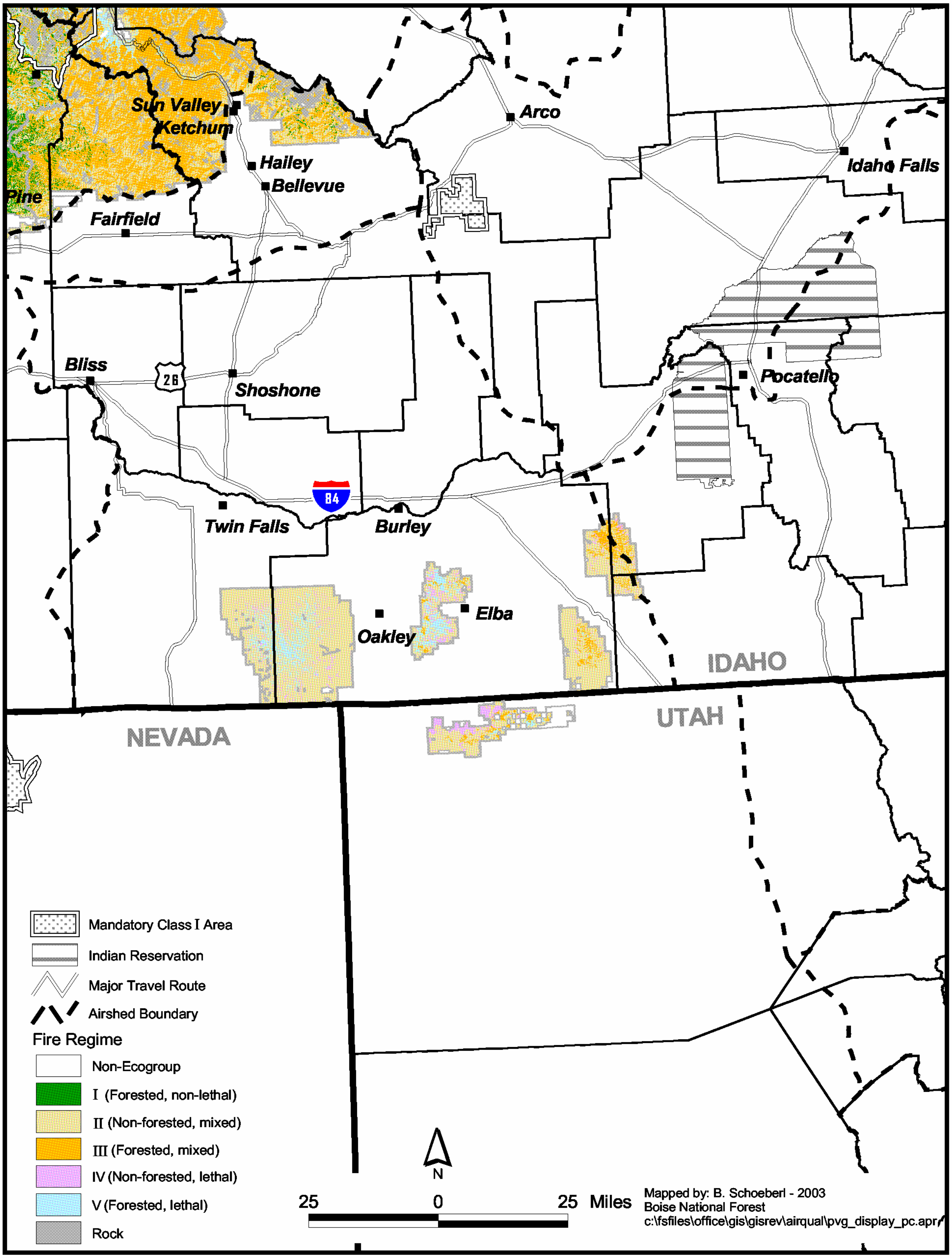


Table AQ-17. Factors Considered to Evaluate the Risk of Direct/Indirect and Cumulative Effects from Smoke to Class I Areas

Factors Considered for:	Indicates Increasing Potential or Relative Risk of Smoke-related Concerns	Type of Potential Impact and Rationale
Potential Risk of Direct/Indirect Effects		
Wind Direction (using prevailing direction from representative months)	Class I Area is in the same airshed and downwind of Ecogroup administered lands based on prevailing representative surface winds	Increased likelihood of smoke impacts to Class I area
	Class I Area is not in the same airshed as Ecogroup administered lands but is downwind based on prevailing representative upper level (850 millibar) winds	Increases likelihood of smoke impacts to Class I area
Potential Risk of Cumulative Effects		
Season (spring, summer, fall, winter)	Season of best/worst visibility	Increases in the amount of fire use may contribute to visibility impairment in areas or during seasons currently experiencing concerns

Elements Common to All Alternatives

Resource Protection Methods

Resource protection has been integrated into air quality and smoke management direction at various scales, from national to site-specific. The cumulative positive effect of the multi-dimensional direction described below is beneficial protection and mitigation for all resources or populations that may potentially be adversely affected by smoke-generating activities or events.

Laws, Regulations, and Policies – Numerous laws, regulations, and policies govern the use of fire or other sources of air pollutants on National Forest administered lands. The Federal Clean Air Act and amendments provide the main regulatory framework to protect air quality. A brief summary of key applicable sections is described below with more detailed description along with other important direction included in Appendix H in each Land Management Plan. The Clean Air Act is a legal mandate designed to protect public health and welfare from air pollution primarily through the National Ambient Air Quality Standards. States develop specific programs for implementing the goals of the Clean Air Act through their State Implementation Plans (SIP's). States may develop programs that are more restrictive than what the Clean Air Act requires but never less. National laws and regulations have also been interpreted for implementation in Forest Service Manuals, Handbooks, and Regional Guides. Fire use activities must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation of a fire use program, while protecting air quality. In addition, federal agency actions must conform to applicable State Implementation Plans. Multi-state or jurisdictional groups have been formed in several areas around the country to address air pollution issues that are related to long-range transport of pollutants such as the regional haze.

Forest Plan Direction – Forest Plan management direction for air quality and smoke management does not vary by alternative. Direction was developed to reduce potential impacts from land management activities on National Forest administered lands to air quality. Direction was also developed to consider emissions from other sources as well as to address planning elements described in the *Interim Policy* that are appropriate to evaluate at the project level. Air quality goals and objectives have been designed to achieve desired air quality and smoke management conditions over the short and long term.

Forest Plan Implementation – Fire use planning depends on current and site-specific information about fuel and meteorological conditions, air movement patterns, timing and duration of use, the availability of ignition and suppression resources, etcetera. These factors are not easily addressed at the programmatic level, and are generally similar for all alternatives. The prescribed fire planning process, however, can and will address all of these factors at the project-level and during implementation. Through this process, which is the same for all alternatives, adjustments would be made to address resource concerns in a timely, effective, and site-specific manner that involves the Forest Service, cooperating agencies, and the public in land management actions. In addition, all prescribed burning in Idaho and Utah is coordinated through each state's Smoke Management Program to minimize or prevent smoke impacts.

Forest Plan Monitoring – The Forest Plan does not include monitoring for impacts to ambient air or visibility since these are regulated through the Clean Air Act as NAAQS, or are anticipated to have regulatory requirements in the future (regional haze). The state DEQ's have monitoring and enforcement responsibilities. In Idaho, the DEQ has developed a statewide monitoring network for PM 2.5 to determine attainment status and compliance with the NAAQS (Figure AQ-16). The Forests can, in partnership, with DEQ provide for additional monitoring for special purposes. One ambient air monitor has been installed in Garden Valley to monitor PM 2.5 levels. The purpose of this monitor is to provide additional information about ambient air and support prescribed burn decisions. The IDEQ also uses this monitoring as part of their network to inform the public of current conditions using Air Quality Indices. Additional monitoring could be employed during project implementation. This would primarily be observation of plume trajectories as a mitigation measure to ensure that during implementation, smoke would not unduly impact a sensitive area. This monitoring could also be used to mitigate effects by limiting the amount or length of time smoke is produced.

Monitoring the impacts of fire use activities on visibility in Class I Areas is conducted using the IMPROVE network. The network has been undergoing expansion since 2000 to add to the number of sites that have modules to determine types of pollutants causing or contributing to visibility impairment. All Class I Areas within the area of consideration have been or will be upgraded as part of this expansion (Figure AQ-16).

Effects Common to All Alternatives

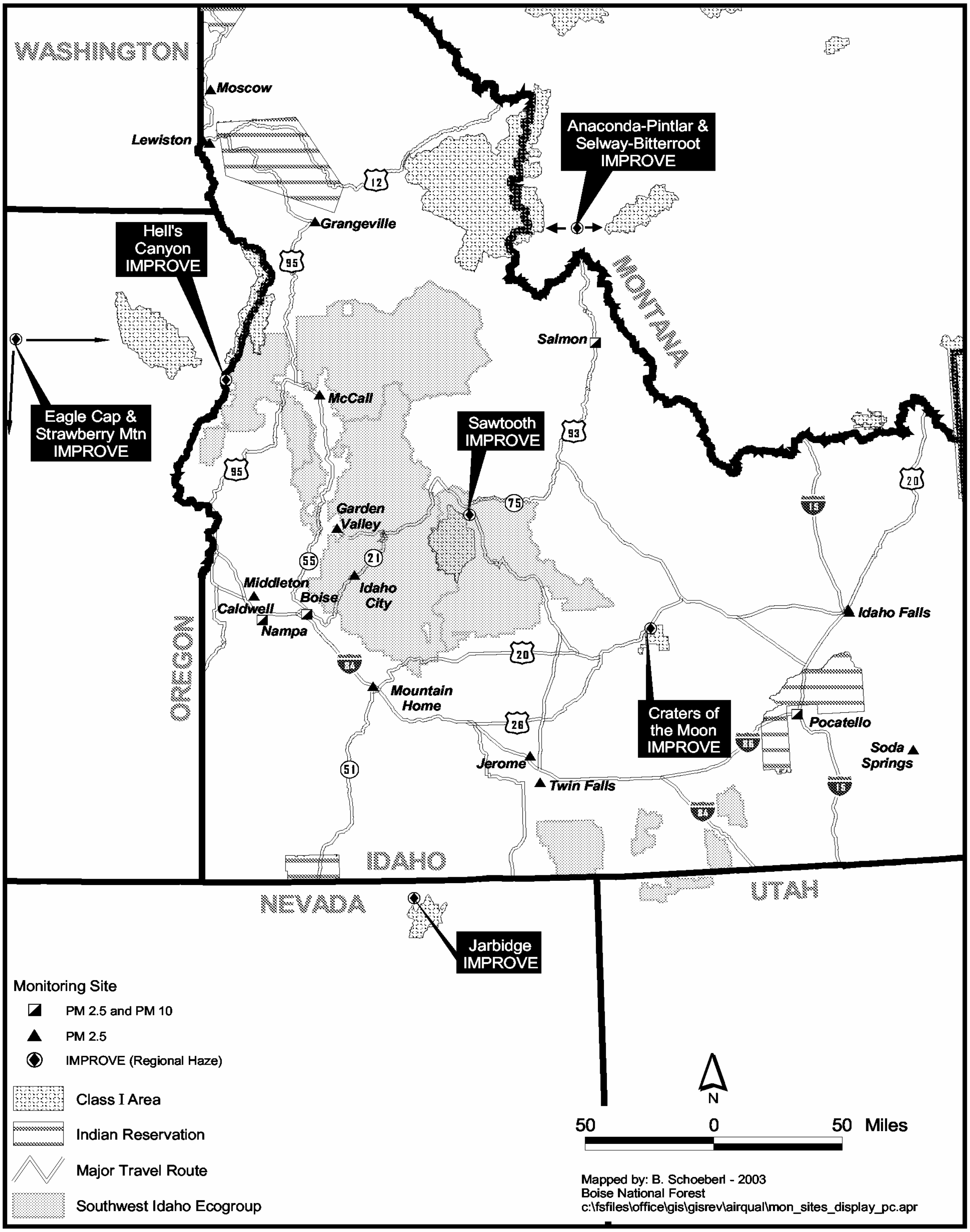
Fire Use and Wildfire Effects - Fire has played a major role in the development and maintenance of most ecosystems within the Ecogroup. The long-term future of the Ecogroup is dependent on fully functioning ecosystems that are capable of sustaining ecological processes and human uses.

An increase in accumulated fuels over the Ecogroup has occurred because of past land management practices, including decades of fire exclusion. This is evident by ecosystem changes that include increased vegetative densities, altered structures, and disrupted nutrient cycling. As a result, wildfires are becoming larger in size, uncharacteristically lethal, and more dangerous and costly to suppress. Studies have shown that prescribed fire can reduce the size, frequency, and intensity of wildfires (Deeming 1990, Omi and Martinson 2002). Areas that have been treated with prescribed fire often support fewer crown fires resulting in a slowing of wildfire spread.

Fire is an essential component of most ecosystems, and the use of fire to maintain or restore ecosystem processes and functions is desirable. A substitute for the ecological role of fire has not been found in many ecosystems. One goal of the fire use program is to cooperatively meet land management objectives and concerns about public health and visibility. However, wildfire, in particular uncharacteristic wildfire, can have undesirable impacts both on resources and air quality.

Smoke Management Techniques – Land managers employ emission reduction and smoke management techniques to reduce air quality impacts from fire use, in particular from prescribed fire. Current smoke management techniques take into account the timing and location of fires so that impacts on human health are balanced with achieving resource management objectives. These techniques are applied based on-site specific factors to minimize impacts on visibility impairment and public health. When possible, ignitions are delayed due to social considerations like major community events. Although ignitions can be delayed when necessary to meet social considerations, delays may prevent burns being completed annually as planned. Often when restoring fire, “cool” prescriptions are needed to achieve resource objectives. These are usually accomplished using higher fuel moistures, which in turn reduces emissions. Higher fuel moistures most often occur in the spring and fall. Conducting burns in the spring compared to the fall produces seasonal advantages because spring weather patterns produce more days with better daytime dispersion, especially at lower elevations. Other techniques such as burning clean piles and biomass utilization (alternatives to burning) can also be used.

Figure AQ-16. Ambient Air and Visibility Monitoring Sites in and Adjacent to Portions of Idaho



Alternatives to Burning and Emissions Reduction – In addition to the areas with steep slopes (greater than 40 percent) or designated as wilderness, Management Prescription Categories provide different opportunities for the use of mechanical equipment. These limitations are based on standards and guides applied to meet the MPC themes. In some cases, mechanical treatments may be prohibited while in other cases opportunities may be limited due to lack of access. To determine how opportunities for alternatives to burning may vary by alternative, MPCs were categorized into three opportunity groups: Very Limited, Limited, and Not Limited. MPCs assigned to the Very Limited opportunity group were 1.2, 2.1 (Wild), 3.1, 4.1a, 4.1b, and 4.1c. There MPCs either have standards and guides that prohibit mechanical treatments, or are so constraining, due to very small expected volumes or lack of access, that they are essentially not feasible to consider for mechanically removing biomass as an alternative to burning. MPCs assigned to the Limited opportunity group were 3.2, 4.2, 5.1, and 6.1. In these MPCs, access, or conflicts with the theme of the MPC may limit opportunities. Examples are MPCs 5.1 and 6.1 in which restoration, including the use of fire, is the MPC theme. The Not Limited opportunity group is made up of MPCs 5.2 and 6.2. These MPCs emphasize producing goods and services, and provide the kinds of mechanical options, infrastructure such as roads, landings, etcetera, that facilitate biomass removal. However, even in areas where mechanical treatments are used alone, some prescribed fire may still be necessary. This is because mechanical treatments cannot replace fire in supporting certain ecosystem functions. In addition, fire is often used to reduce hazardous fuels created from mechanical treatments.

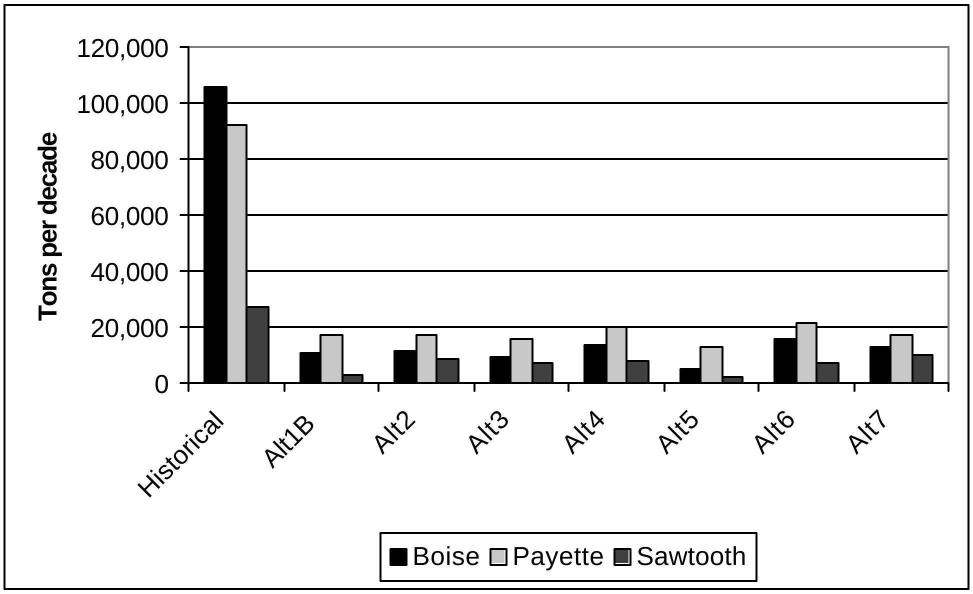
Direct and Indirect Effects by Alternative

Smoke Emissions From Fire Use for Vegetation Management

Fire use for vegetation management includes treatments used to move toward or maintain desired conditions for forested and non-forested vegetation, or to treat fuels associated with mechanical activities in forested vegetation (see the *Fire Management* section). Each alternative produced different potential levels of emissions based on various combinations of vegetative treatment activities. Figure AQ-15 displays the estimated tons per decade of historical PM 2.5 smoke emissions by Forest, and the average over the first 5 decades estimated for fire use by Forest and alternative. The levels for the Payette and Sawtooth include decadal projections of emissions from the Frank Church – River of No Return and Sawtooth Wildernesses based on their current Management Plans. Overall for the Ecogroup, no alternatives produced even a quarter of the emissions that may have occurred historically (Figure AQ-17). The closest was Alternative 6, which based on acres treated, burned about 20 percent of the historical acreage.

For all three Forests, Alternative 5 produced the least emissions. However, though Alternative 6 produced the most on the Boise and Payette, Alternative 7 produced the highest levels on the Sawtooth. The order of Alternatives on the Boise and Payette are the same. The Sawtooth exhibits a much different ranking due to the amount of area in the non-forested communities. The arrangement of the alternatives from most to least amount of fire use was different for non-forested compared to forested vegetation (see the *Fire Management* section). As the Sawtooth contains the greatest amount of non-forested vegetation, this influenced the arrangement of alternatives relative to smoke emissions.

Figure AQ-17. Average Estimated PM 2.5 Fire Emissions per Decade Historically and for Fire Use, by Alternative by Forest



<u>**Smoke Emissions by Fire Regime**</u>

In all but one alternative, fire use in Fire Regime III and V (forested, mixed and lethal) accounted for the largest source of total estimated PM 2.5 emissions (Table AQ-18). The only exception was on the Sawtooth for Alternative 5 where the emissions from Fire Regime II and IV (non-forested, mixed and lethal) exceeded those from fire use in forested communities.

Table AQ-18. Percent of Total Estimated PM 2.5 Smoke Emissions From Fire Use by Forest and Alternative

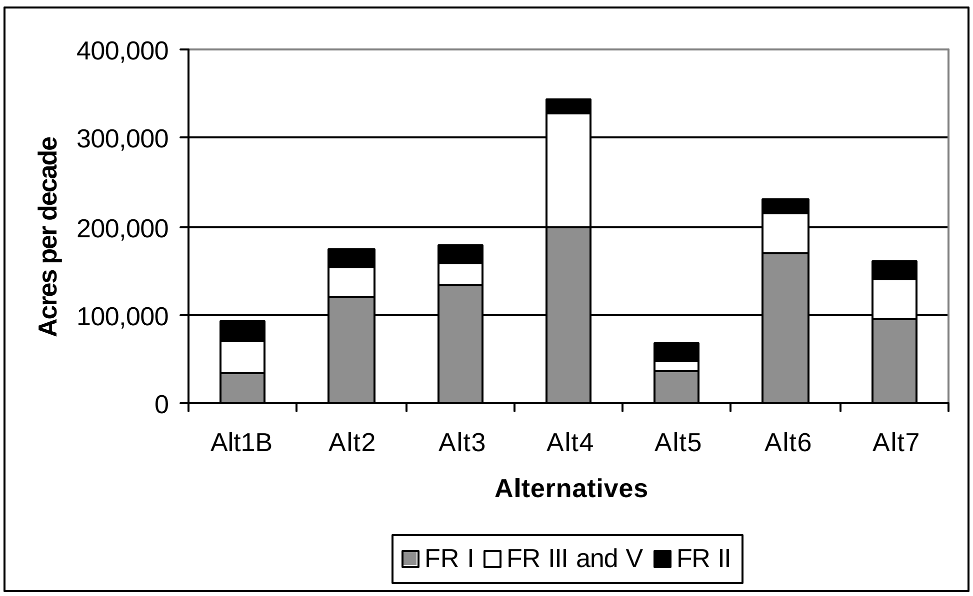
(Average per decade over a 5-decade time period)

Forest and Indicator	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt.7
Boise National Forest							
Fire Regime I	11	23	32	41	16	43	17
Fire Regimes III and V	73	60	52	55	42	53	71
Fire Regimes II and IV	1	1	1	1	2	1	1
Activity Fuels	15	15	14	3	37	3	10
Payette National Forest							
Fire Regime I	23	29	28	33	25	31	23
Fire Regimes III and V	71	68	67	66	66	67	72
Fire Regimes II and IV	NA[1]	NA	NA	NA	NA	NA	NA
Activity Fuels	5	4	5	1	9	2	5
Sawtooth National Forest							
Fire Regime I	0	3	3	3	4	5	2
Fire Regimes III and V	51	78	72	79	34	77	79
Fire Regimes II and IV	38	16	21	17	48	16	16
Activity Fuels	10	3	4	1	14	1	3

[1]Non-forest vegetation not modeled on Payette Forest

The large amount of estimated PM 2.5 emissions from Fire Regimes III and V (forested, mixed and lethal) are not necessarily due to the more burning in this fire regime. In most cases, alternatives treat more acres in Fire Regime I (forested, nonlethal) in order to reduce uncharacteristic wildfire hazard (Figures AQ-18, AQ-19, AQ-20). More emissions are produced from Fire Regimes III and V (forested, mixed and lethal) due to greater fuel loadings and the expectation that for all alternatives except 1B, burning in this fire regime will more often be from wildland fire use than prescribed fire. Emissions from wildland fire use in these fire regimes are expected to produce greater emissions than prescribed burning in nonlethal fire regimes as Fire Regimes III and V generally accumulate greater fuel loadings. In addition, wildland fire use burning is expected to occur under drier conditions than prescribed fire. This would increase the amount of consumption and subsequently the amount of emissions.

Figure AQ-18. Average Fire Use Acres per Decade for the Boise Forest by Historical Fire Regime[1] and Alternative



[1]Non-forest vegetation (Fire Regimes II) modeled only on southern portions of the Boise Forest

Figure AQ-19. Average Fire Use Acres per Decade for the Payette Forest by Historical Fire Regime and Alternative

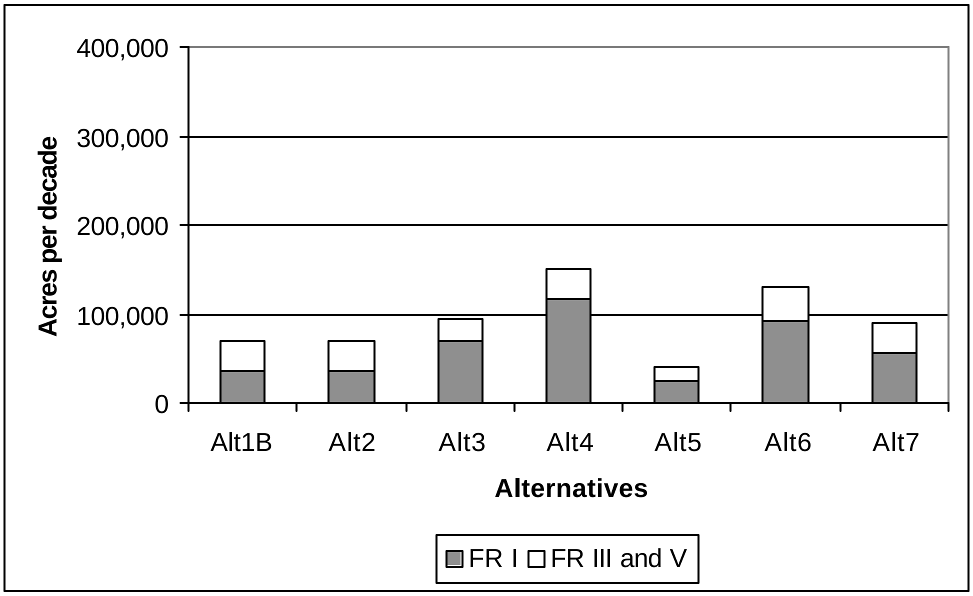
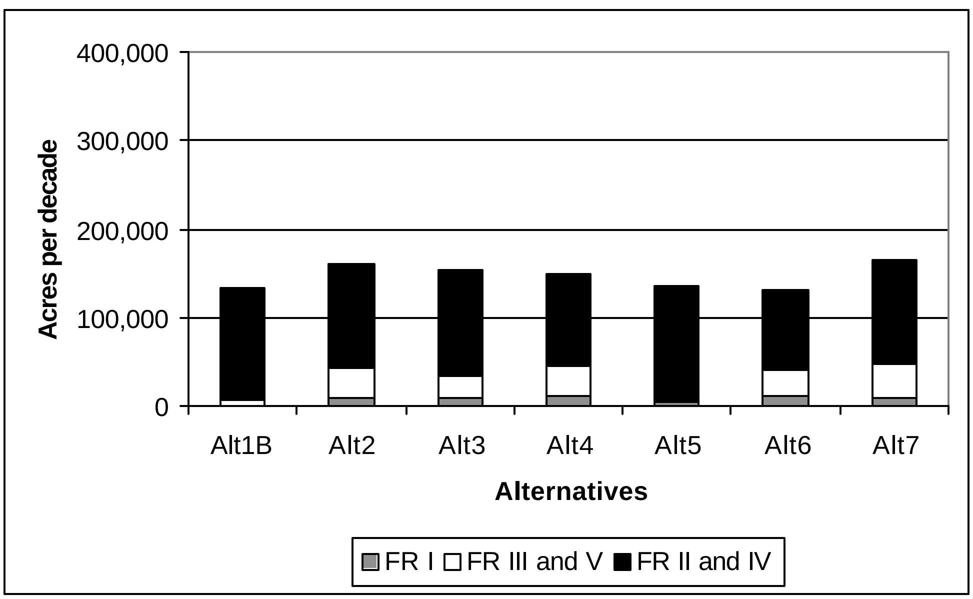


Figure AQ-20. Average Fire Use Acres per Decade for the Sawtooth Forest by Historical Fire Regime and Alternative



Acres treated in the various fire regimes vary across the three Forests in the Ecogroup. This reflects the vegetation/fire regime changes that occur over the area in response to a variety of factors including climate, elevation, soils, topography, and latitude (see the *Vegetation Diversity* section for more explanation of vegetative distributions). The Boise has a greater amount of area Fire Regime I (forested, nonlethal) than either the Payette or Sawtooth and the number of acres treated by alternatives in this Fire Regime is highest on the Boise. The Sawtooth has a much greater extent of area in Fire Regimes II and IV (non-forested, mixed and lethal). Subsequently this area treats the most acres in this Fire Regime.

Wildfire

Two different modeling approaches were used for the forested and non-forested vegetative communities to represent wildfire (See Appendix B). Forested vegetation was modeled using SPECTRUM, which does not provide a mechanism for handling large-scale stochastic events. This is in contrast to the VDDT modeling used for the non-forested communities. This model was developed to represent small and large-scale stochastic events.

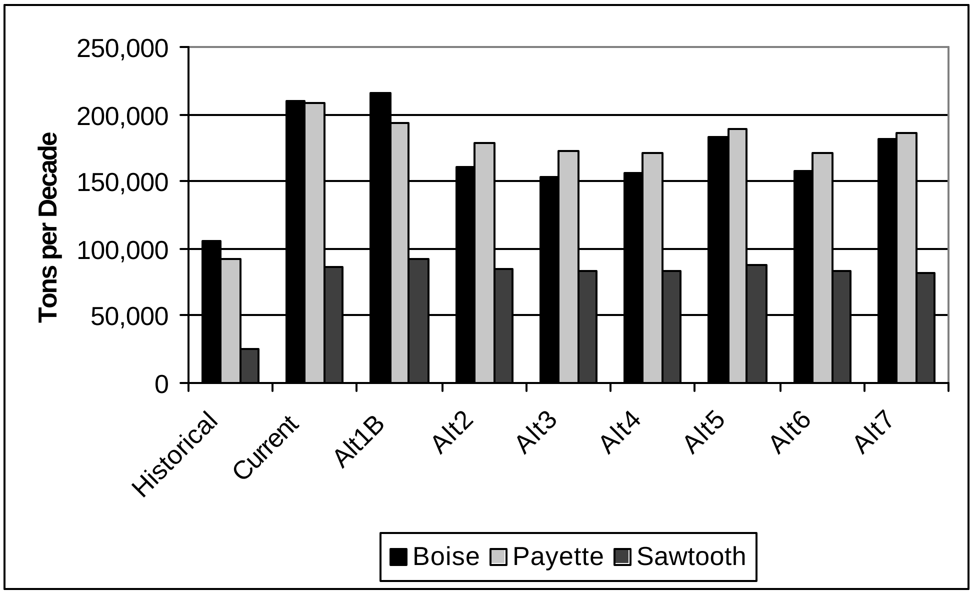
Forested Vegetation – Wildfire smoke estimates include potential emissions from acres burned from the "background wildfire" and acres of hazardous vegetative conditions (see the *Vegetation Hazard* section). Vegetation in hazardous conditions is assumed to contribute to the risk of wildfires, particularly uncharacteristic wildfires. The SPECTRUM modeling does not account for large-scale, stochastic events like uncharacteristic wildfires. In this case, vegetative hazard was used as a mechanism for representing the potential for these kinds of wildfires. Background wildfires were included in the SPECTRUM modeling and were assumed to be recurring events that produced constant low amounts of emissions.

These estimates do not attempt to display how much smoke may be produced from a single wildfire event, but rather represent the total average over five decades of smoke stored in hazardous vegetation.

Emissions produced historically are estimated to be less than the amount stored in hazardous vegetative conditions in forested communities (Figure AQ-21). Currently, vegetative conditions are such that uncharacteristic wildfires could produce more than twice to almost three times the PM 2.5 emissions produced historically. The uncharacteristic conditions on the Boise have the potential to produce smoke emissions that are about 2 times greater than historical levels (Figure AQ-21). Potential emissions on the Payette and Sawtooth are about 2.3 and 2.7 times greater than historical, respectively.

Potential smoke emissions were altered for alternatives based on changes in vegetation, which in turn affects the uncharacteristic wildfire hazard (see the *Vegetation Hazard* section). Over the first five decades, all alternatives except 1B on all three Forests reduced the potential wildfire emissions from current levels (Figure AQ-21). Reducing hazardous vegetative conditions was a modeling goal of all alternatives except 1B to represent National Fire Plan objectives. On the Boise, Alternative 3 followed by 4 and 6 reduced potential emissions the most compared to the current condition. These three alternatives had the lowest 5^{th} decade uncharacteristic wildfire hazard indexes (see the *Vegetation Hazard* section). For the Payette, Alternatives 4, 6, and 3 were the lowest compared to the current condition. Again these three alternatives had the lowest 5^{th} decade hazard indexes. On the Sawtooth, Alternative 7 produced the lowest potential wildfire emissions followed by 4. Alternatives 3 and 6, which were next lowest, were the same.

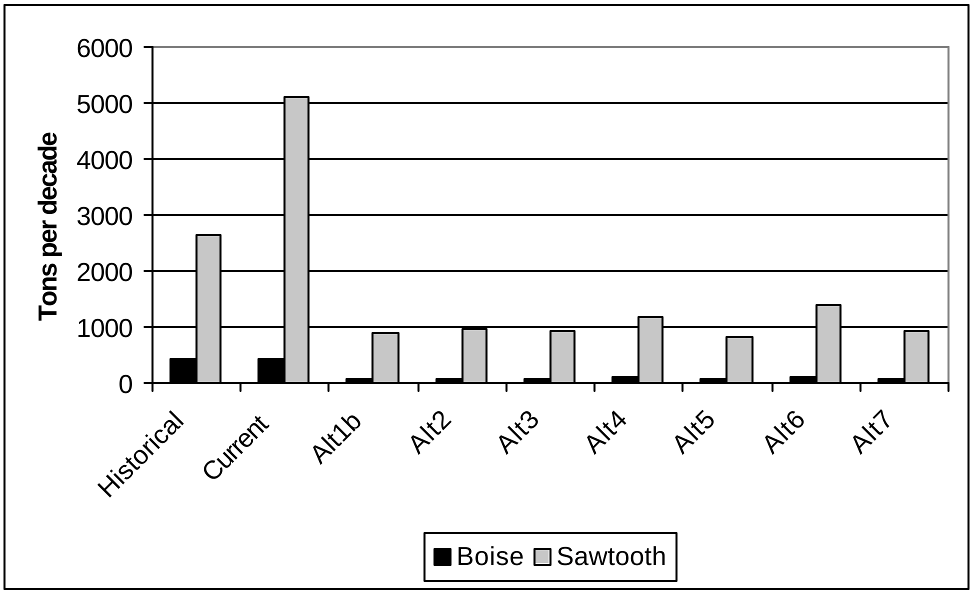
Figure AQ-21. Potential PM 2.5 Emissions Stored in Hazardous Vegetative Conditions in Forested Vegetation for Alternatives by Forest



Non-forested Vegetation – Background and uncharacteristic wildfire were both represented in the VDDT modeling for the non-forested vegetation. There were not enough acres on the Payette to model so only the Boise and Sawtooth were included. Like the modeling done for the forested communities, the VDDT model was used to show how different combinations of vegetative treatments influence vegetative conditions, including hazard, and the potential affects these changes have on wildfire events. Based on recent historic (since 1950) wildfire data, probabilities were developed and interjected to represent background and large-scale wildfires (failed fire suppression). These events were used for alternative comparison only; they do not represent a "best guess" of when future wildfires will occur. Rather they were used to display how changes in vegetative conditions produced by the different alternatives may influence wildfires.

Current potential emissions for the Boise are about the same as the estimated historical level; they are about two times the estimated level on the Sawtooth (Figure AQ-22). Alternative 5 followed by 7 had the lowest modeled wildfire emissions over the 5-decade time period. Alternatives 4 and 6 were the highest. Alternatives 5 followed by 7 reduced the number of acres in the most hazardous vegetative conditions while Alternatives 4 and 6 retained the most. Acres in hazardous vegetative conditions were closely linked to acres burned by both kinds of wildfire in the modeled scenarios.

Figure AQ-22. Potential PM 2.5 Non-forested Wildfire Emissions from Background and Failed Fire Suppression for Alternatives by Forest

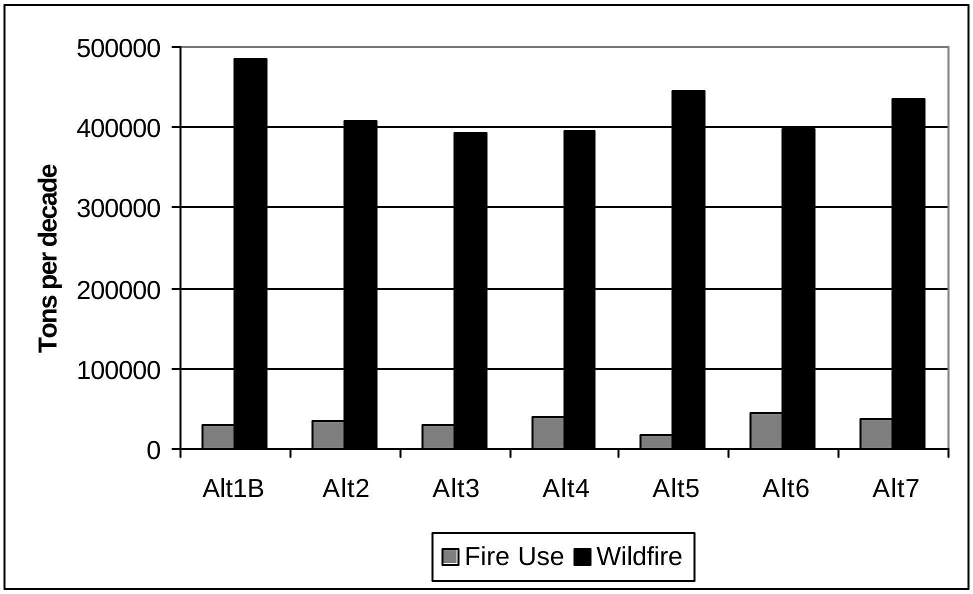


Comparison of Fire Use Versus Wildfire Emissions

Forested Vegetation - Fire is used as a vegetative management tool to restore or maintain desired conditions. It may be used alone or in combination with mechanical treatments depending on the Management Prescription Categories applied for the various alternatives. The conditions created on the landscape determine the vegetative hazard and the potential risk of wildfire. However, fire use to achieve desired conditions creates a tradeoff in emissions relative to potential wildfire.

In the forested communities the estimated emissions from fire use were much lower than the potential wildfire emissions over five decades for all alternatives (Figure AQ-23). This was in part due to differences in acres affected. That is, fewer acres were burned with fire use than are at risk to uncharacteristic wildfire over the first five decades. In addition, fuel consumption levels were assumed to be lower for fire use than wildfire since fire use is conducted within prescriptions designed to reduce impacts on resources. Lethal fire, regardless of whether it is within the historical fire regime or not, generally produces the greatest impacts to ecosystems. In vegetative types that contribute the most to uncharacteristic wildfire hazard, that is, the nonlethal and mixed1 fire regimes, fire use would be to emulate the lower intensity and severity burning consistent with the historical regime. Therefore fire use would not generally be lethal. Lethal wildfires consume much more fuel and therefore produce much higher emission levels.

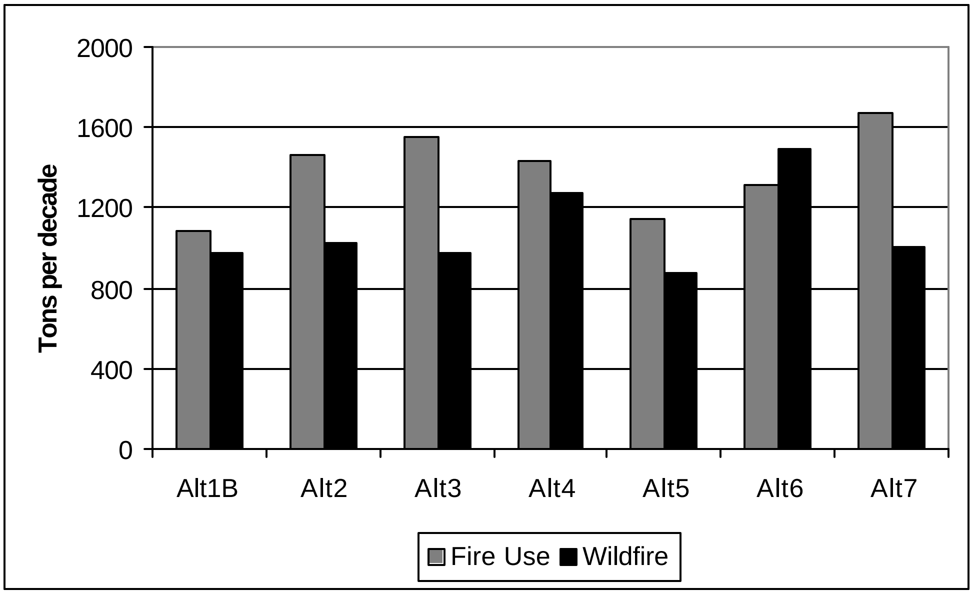
Figure AQ-23. Emissions from Fire Use in Forested Vegetation versus Potential Uncharacteristic Wildfire for Alternatives



Alternative 3 reduced the uncharacteristic wildfire hazard indexes to about the same levels as Alternatives 4 and 6 (see the *Vegetation Hazard* section, Table VH-14). However, the estimated emissions generated by this alternative are lower than Alternatives 4 and 6. This is due to the mix of tools defined by the Management Prescription Categories applied to Alternative 3 compared to 4 and 6. The MPCs in Alternatives 4 and 6 emphasize fire use whereas in Alternative 3, MPCs are a greater mix of mechanical and fire use treatments. For Alternative 5, which has the lowest fire use due to the greater emphasis on mechanical treatments, potential wildfire hazard is second highest of all the alternatives. In the case of this alternative, the desired conditions, which emphasize younger, denser vegetative, tend to be more hazardous because they represent denser, more continuous fuel conditions than historical (see the *Vegetation Hazard* section). Alternative 1B produces the greatest uncharacteristic wildfire hazard over the five decades. The desired conditions for this alternative are more hazardous than most other alternatives (see the *Vegetation Hazard* section, Table VH-11), and unlike the other alternatives, do not emphasize vegetative treatments to reduce hazard.

Non-forested Vegetation - The difference between estimated fire use and wildfire emissions was much closer in the non-forested communities compared to the forested vegetation (Figure AQ-24). Like with the forested, Management Prescription Categories for the alternatives determine the various mixes of treatments that will occur. These include fire use, chemicals, and grazing in all vegetative types plus mechanical treatments in aspen and juniper woodlands. The vegetative conditions that result determine the level of hazard and the amount of potential wildfire.

Figure AQ-24. Emissions from Fire Use in Non-forested Vegetation Versus Potential Wildfire for Alternatives



Alternative 5 produced the lowest estimated levels of wildfire emissions over the five decades. Compared to other alternatives, fire use emissions were second lowest. Overall, this alternative has the highest level of fire use for non-forested vegetation (see the *Fire Management* section for further discussions on fire use treatments). However, the primary kind of fire use is from prescribed fire rather than wildland fire. Prescribed fire is assumed to produce lower levels of emissions than wildland fire use. This is based on the assumption that fuel consumption using prescribed fire is less than wildland fire use because prescribed fire is more likely to be implemented when fuel moistures are higher. Therefore emissions from prescribed fire would be lower.

Alternative 7 produced the greatest level of fire use emissions; wildfire emissions were at similar levels to Alternatives 1B, 2, and 3. While acres treated with fire use in this alternative are toward the lower end, the high emissions are due to a combination of prescribed fire and wildland fire use. Alternatives 1B, 2, and 3 all have higher levels of fire use than Alternative 7 but all have a greater emphasis on prescribed fire. Alternative 6 produced the highest wildfire emissions. Fire use in Alternative 6 is the lowest of all alternatives on the Sawtooth and second lowest on the Boise next to Alternative 4. However, even though treatment levels were lower in these two alternatives, both emphasize wildland fire use over prescribed fire.

<u>Risks to Designated Sensitive Areas</u>

Non-attainment and Maintenance Areas – The Northern Ada County PM 10 Non-attainment/Carbon Monoxide Maintenance Area is in Airshed 22. The Boise Forest is the only Ecogroup unit within this airshed. The Boise administers less than 1 percent of the area (3,400 acres) in Ada County. The dominant historical fire regimes in this portion of the county are Fire Regimes I (forested, nonlethal) and II (non-forested, mixed). In addition to other mitigations associated with this area, Forest Plan Management Area direction was developed to ensure that State Air Quality managers were involved early in the planning processes that may impact air quality, in particular the PM 10 and carbon monoxide levels. Due to the relatively minor amount of administered lands within the county, impacts from fire use would be low. Fire use also does not normally occur during the winter, which is the season of poorest dispersion.

Portneuf Valley PM10 Non-attainment Area is in Airshed 19, which does not contain any Ecogroup administered lands. Due to the distance between the Ecogroup and the Non-attainment Area, in combination with the coordination that occurs through the Montana/Idaho Airshed Group, there is little likelihood that smoke generated by the Ecogroup would contribute to existing problems in this area. In addition, fire use activities generally do not occur in the winter, which is the main season in which past exceedances have occurred.

Visibility Impairment (Mandatory Class I Areas) – Wind patterns for representative months (April, July, and October) were used to evaluate the potential risk of smoke impacts to Class I areas from fire use activities in spring, summer, and fall at two different scales (see the Dispersion Meteorology discussion in this section). The 30-year average upper level winds (850 millibar at approximately 1,500 meters above sea level) winds were used as an indicator of the potential for smoke impacts between airsheds based on the general wind direction. Table AQ-19 summarizes the upper level and surface winds for each Class I area and indicates whether the predominate wind pattern might carry smoke towards or away from it.

Table AQ-19. Summary of Prevailing Representative Seasonal Surface and Upper Level Winds for Class I Areas within the Area of Consideration

Class I Area (name)	State(s)	Within Direction of Prevailing Upper Level Winds[1]	Airshed	Adjacent Ecogroup unit	Within Direction of Surface Winds[2]		
					April	July	Oct
Eagle Cap Wilderness	OR	No	N/A	N/A	N/A	N/A	N/A
Hells Canyon Wilderness	OR, ID	No	ID-13	N/A	N/A	N/A	N/A
			ID-14	Payette	No	No	Yes
			ID-15	Payette	No	No	No
Selway-Bitterroot Wilderness	ID, MT	No[3]	ID-13 MT-4	N/A	N/A	N/A	N/A
Anaconda-Pintlar Wilderness	MT	No[3]	MT-4 MT-5 MT-7	N/A	N/A	N/A	N/A
Sawtooth Wilderness	ID	Yes	ID-15	Boise	Yes	Yes	Yes
				Sawtooth	No	Variable	No
			ID-17	Sawtooth	No	Yes	No
			ID-21	Boise	No	Yes	Yes
				Sawtooth	No	Variable	No

Class I Area (name)	State(s)	Within Direction of Prevailing Upper Level Winds[1]	Airshed	Adjacent Ecogroup unit	Within Direction of Surface Winds[2]		
					April	July	Oct
Craters of the Moon National Monument	ID	Yes	ID-19	N/A	N/A	N/A	N/A
Jarbidge Wilderness	NV	No	N/A	N/A	N/A	N/A	N/A

[1]Upper level winds used are the 850 mb winds and vary little in direction during representative seasons (April, July and October). Wind direction would generally transport smoke in an easterly direction across the Ecogroup.
[2]Surface winds were evaluated only for areas adjacent to the Ecogroup
[2]During wildfire events plume trajectories have been observed to predominately flow in a northeast direction and could carry smoke into these wilderness areas.

If the dominant direction or pattern could not be generalized, this was listed as variable. If that direction is predominately toward a Class I area from Ecogroup activities, then the risk of smoke impacts increases, increasing the concern about implementation of fire use. If the predominate flow is away from the area, then the risk of impacts and concerns regarding implementation decreases. The 30-year average surface winds (10 meters above ground level) were used as an indicator of the potential risk of smoke impacts within an airshed.

Information from these wind fields indicates only a generalized evaluation of the potential for smoke to travel toward or away from a Class I area. Other factors also determine which winds (upper or surface) may transport or influence the plume trajectory including how strong the winds are, and the mixing heights or depth of the mixing layer. We assumed that the upper level winds would be more likely to carry smoke from wildland fire use activities since emissions from these types of fire can be of greater magnitude than prescribed fires. Prescribed fires, especially where lower intensity and severity fires are needed to achieve certain resources objectives, would be carried primarily by surface winds.

Upper level winds vary little over the Ecogroup in the spring and summer (Figures AQ-10, AQ-11, AQ-12). During this time period, winds generally blow east to southeast. This changes in the fall when winds generally travel east to northeast over some of the area. The prevailing flow in Airsheds 14, 15, and 16 is northeasterly. Surface winds a more difficult to generalize. Surface flows vary between and within airsheds and can change with seasons. Surface winds follow the terrain and therefore in complex, mountainous areas, wind direction varies. The potential risk of smoke impacts would therefore vary depending on the location of the burning relative to the sensitive area within the airshed.

The general wind patterns from the Ecogroup are away from the Eagle Cap Wilderness. This area is not downwind of the prevailing upper level winds. In addition, although the Wilderness is within the area of consideration, it is not adjacent to the Ecogroup. Therefore this area is unlikely to be impacted by Ecogroup activities.

The Hells Canyon Wilderness is adjacent to the Payette Forest boundary. However, prevailing upper level winds would transport smoke from fire use on the Payette away from this area. Surface winds in the spring and summer would also transport smoke away. In Airshed 14, surface winds in the fall could carry smoke toward this area. In this case, smoke produced by prescribed burning in the fall may be carried into the Wilderness.

The Selway-Bitterroot and Anaconda-Pintlar Wildernesses are within the area of consideration but are not adjacent to Ecogroup administered lands. The upper level winds would generally transport smoke plumes away from the Wilderness. However, smoke from upper level winds blowing from the southwest was observed to transport smoke into this area during the 2000 fire season (IDEQ undated).

The Sawtooth Wilderness lies downwind of the Payette and Boise Forests. However, fire use activities on the Payette pose a relatively low risk of smoke impacts since the Payette is not immediately adjacent. Activities occurring in northwestern portion of Airshed 21 and the southern end of Airshed 15 have the potential to impact the Wilderness based on surface winds, particularly in the summer. Therefore prescribed fire and wildland fire use, depending on where they occur, could impact the Wilderness.

Though Craters of the Moon is not adjacent to the Ecogroup, there is some risk of smoke since this area is downwind from portions of the Ecogroup. Upper level winds could transport smoke from fire use into the area. The potential risk is greatest from activities occurring in Airshed 24 and southern portions of Airshed 21.

The Jarbidge Wilderness does not occur adjacent to the Ecogroup. In addition, smoke generated by the Ecogroup would flow away from this area during all seasons based on upper level winds.

Emissions from fire use and wildfire along with other sources, contribute to levels of organic and elemental carbon. Emissions from wildfire and wildland fire use would most likely occur during the same seasons. However, the contribution to impairment would be episodic and unlikely to occur annually. Prescribed fire is most often implemented in the spring and fall seasons. Therefore it is likely that the best visibility days will not be affected by prescribed burning within the Ecogroup since the best days occur in the winter when prescribed burning is typically not conducted. The poorest visibility days and years typically coincide with extreme wildfire seasons when we have little control over the number of acres burned and fuel consumed, and subsequently smoke impacts to visibility.

Summary of Risks to Other Sensitive Areas

Airshed 14 – The Ecogroup administers 28 percent of the lands in the airshed. Of this, most (23 percent) is the Payette Forest; the Boise makes up the remainder (5 percent). From 1981 through 2000, wildfire smoke has not had as much influence on this airshed as others (for example Airsheds 15 and 21). The number of acres burned by wildfire and prescribed fire during this time was relatively close. Wildfire burned about 1.5 percent of the area and about 1.0 percent was burned using prescribed fire.

Burning conducted by Airshed Group members does not appear to be of concern in this airshed. In the past, the Boise and Payette Forests rarely burned at the same time in the airshed. The amount of past burning has been relatively small; during the peak burning years (1995-1999), an average of 3,800 acres were burned annually. This is in comparison to 2001-2002 when as much as 8,900 acres was planned. However, only around 2,300 to 3,400 acres were accomplished, which is below the 1995-1999 average.

Under most alternatives, prescribed fire is the most likely source of smoke contributing to particulate matter as prescribed fire treatments are available under all alternatives throughout the airshed. Although portions of the Ecogroup within the airshed have been identified as part of the Wildland Fire Use Planning Area (see the *Fire Management* section) implementation may be limited by the size and shape of administered lands. This Ecogroup area contains a relative large number of vegetative acres that are in Fire Regime I (forested, nonlethal) (and II [non-forested, mixed] though this was not modeled for the Payette or the northern portion of the Boise [see the *Vegetation Diversity* section]). On the Payette, all alternatives burn more acres in this fire regime over the next five decades than Alternative 1B. This is primarily due to the goal to reduce the number acres with vegetative conditions that contribute to uncharacteristic wildfire. Fire Regime I currently contains the most number of acres with hazardous conditions. Alternative 4 followed by 6, 3 and 2 on the Payette and Boise burn the most acres in this fire regime over the first five decades (Figures AQ-18 and AQ-19).

Airshed 15 – The Ecogroup administers about 74 percent of the lands in this airshed. Of this, the Boise Forest accounts for 37 percent, the Payette 35 percent, and the Sawtooth 2 percent. From 1991 through 2000, more acres were treated with prescribed fire in this airshed than any other. However, the amount of prescribed fire has been relatively minor (2 percent) compared to the number of acres burned by wildfire (13 percent).

Prescribed fire is allowed throughout the airshed under all alternatives. Valley and Boise Counties contain the most amount of Ecogroup area in Fire Regime I (forested, nonlethal). As noted for Airshed 14, all alternatives burn more acres in this fire regime than Alternative 1B. Alternative 4 followed by 6, 3 and 2 on the Payette and Boise burn the most acres in this fire regime over the first five decades (Figures AQ-18 and AQ-19). Portions of the Ecogroup in this airshed have been identified as part of the Wildland Fire Use Planning Area. Most of the identified area is in the northern and eastern areas of the airshed adjacent to the Frank Church – River of No Return and Sawtooth Wildernesses. In areas where wildland fire use may occur, vegetative types in Fire Regimes III and V (forested mixed and lethal) are the most likely targets. On the Payette, alternatives 6 and 4 burn slightly more acres than 1B in this type. On the Boise, Alternative 4 followed by 7 and 6, treat more acres than Alternative 1B.

Airshed 16 – The Forest Service, including the Ecogroup, administers most of the land in this Airshed (98 percent). Of this, the Payette Forest manages 25 percent, the Boise 4 percent, and the Sawtooth less than 1 percent. The Frank Church – River of No Return Wilderness makes up the majority of the area. This area is administered under an existing Wilderness Management Plan that allows primarily for wildland fire use with small amounts of prescribed fire adjacent to in-holdings and boundaries. Forest Plan revision proposes no changes to the existing Wilderness Management Plan and therefore alternatives do not differ for this area.

Airshed 17 - The Sawtooth administers about 16 percent of the lands in this airshed. In total the Forest Service administers about 58 percent of the airshed. From 1981 through 2000, wildfire and fire use have been relatively minor. During this time period, there were no fires greater than

300 acres and prescribed fire has been used on less than 100 acres annually. This may be due to the vegetation types that occur across this area; the majority of the Ecogroup area is forested and falls into Fire Regimes III and V (forested, mixed and lethal).

Wildland fire use is currently allowed in the Sawtooth Wilderness under an existing Wilderness Management Plan. Additional Wildland Fire Use Planning Areas were identified for eastern portions of the Ecogroup in this airshed. Wildland fire use treatments in the Sawtooth Wilderness generally burn few acres due to the elevations, vegetation types, and the extensive natural fuel breaks in the form of rock and water. Because of the climatic regime over the Sawtooth, the Forest in general receives less dry lightning and therefore fewer ignitions. Ignitions that may result in wildland fire use treatments are expected to occur less often in the forested communities of the Sawtooth compared to the Boise and Payette.

Prescribed fire is allowed throughout the airshed under all alternatives. However, because of the vegetative types, emissions produced by fire use overall, particularly in the forested communities, is anticipated to the lower than the Boise and Payette (Figures AQ-18 and AQ-19). On the Sawtooth, all alternatives except Alternative 5 increase the amount of fire use over Alternative 1B in Fire Regimes III and V (forested mixed and lethal) (see Figure AQ-20). Alternative 2 followed by 4 and 7 treat the most acres.

Airshed 21 – The Ecogroup administers about 80 percent of the lands within the airshed. Of this, the Boise manages 52 percent of the area and the Sawtooth 28 percent. Prescribed fire use has been relatively minor compared to the amount of wildfire that has occurred in this area. From 1991 through 2000, prescribed fire has been used on less than 1 percent of the airshed while 23 percent has been burned by wildfire.

Prescribed fire is allowed throughout the airshed under all alternatives. A little over half the Ecogroup area in the airshed is in Fire Regimes I (forested, nonlethal), and II (non-forested, mixed). All Alternatives on the Boise burn more acres in Fire Regime I than Alternative 1B, in order to reduce uncharacteristic wildfire hazard. This is also the case on the Sawtooth though fewer acres are treated. The Sawtooth supports much less area in the vegetative types that make up this fire regime. On the Boise, Alternative 4 followed by 6, 3, and 2 burn the most acres in Fire Regime I. For the Sawtooth, Alternative 4 followed by 6, 7, and 3 burn the most.

Portions of the Ecogroup have been identified as part of the Wildland Fire Use Planning Area. Most of the identified area is adjacent to the Sawtooth Wilderness. Vegetative communities targeted for wildland fire use are primarily those in Fire Regime III and V (forested, mixed and lethal). On the Boise, Alternative 4 followed by 7 burns then 6 burn more acres over the next 5 decades than Alternative 1B. The other alternatives burn fewer acres than 1B. On the Sawtooth, all alternatives except 5 burn more acres in this type than Alternative 1B. Alternative 7 burns the most followed by 4, 2, and 6.

Airshed 24 – The Ecogroup, primarily the Sawtooth Forest, administers 14 percent of the airshed. The Sawtooth has implemented very few acres of prescribed fire in this airshed. From 1981 through 2000, wildfires burned less than 300 acres although Camas County experienced a spike in emissions in 1996 from wildfire.

Prescribed fire is allowed throughout the airshed under all alternatives. In addition, portions of the Ecogroup have been identified as part of the Wildland Fire Use Planning Area. About half the Ecogroup administered area is made up of non-forested vegetation types in Fire Regimes II (non-forested, mixed). The other half is made up of forested communities in Fire Regimes III and IV (forested, mixed and lethal). In the Forested areas on the Sawtooth, all alternatives except 5 burn more acres in this type than Alternative 1B (Figure AQ-20). Alternative 7 burns the most followed by 4, 2, and 6.

In the non-forested communities, Alternative 1B on the Sawtooth displays the acres that could be treated with fire use based on the Management Prescription Categories assigned to that alternative. However, fewer acres are currently being implemented so all alternatives may burn more acres over the next 5 decades than the current amount. Of these, Alternative 5 burns the most acres in the non-forested followed by Alternatives 3, 2, and 7. Alternatives with Management Prescription Categories that focus on prescribed burning treat more acres than those that emphasize wildland fire use (see the *Fire Management* section).

Airsheds 20, 25, and 1 – The number of acres administered by the Ecogroup Forests is small compared to the overall size of this area. The Sawtooth Forest manages about 10 percent of the area over all three airsheds. Past prescribed burning and wildfire have been minor in this airshed.

Prescribed fire is allowed throughout the airshed under all alternatives. Portions of the Ecogroup Forests within the airshed have been identified as part of the Wildland Fire Use Planning Area. The majority of the vegetation on Ecogroup administered lands is made up of Fire Regimes II and IV (non-forested, mixed and lethal) though there is a small amount of Fire Regime III and V (forested, mixed and lethal) (Figure AQ-20). Fire use in the various alternatives for the fire regimes in this airshed is similar to that described for Airshed 24.

Direct and Indirect Effects to Individual Airsheds

Airshed 14 - Most of the population centers within this airshed are not immediately adjacent to the Forest boundaries. However, there are a few communities, like Cuprum, that are close to the Forest boundary and contain vegetative communities assigned to Fire Regime I (forested, nonlethal) (Figure AQ-14). All alternatives burn more acres in this Fire Regime than Alternative 1B in order to reduce hazard where it is currently high. These activities are focused around communities in the short-term in order to meet National Fire Plan objectives.

Surface winds within the airshed generally carry smoke away from population centers during the spring and fall, which is when prescribed fire is usually conducted. Potential smoke impacts to population centers would primarily be from wildland fire use, if it occurs, and wildfires.

Airshed 15 - The McCall Impact Zone occurs adjacent to the Payette Forest boundary. The dominant fire regimes around the Impact Zone are Fire Regimes III and V (forested, mixed and lethal) (Figure AQ-14). Therefore smoke impacts to this area would be less than may occur for areas adjacent to Fire Regime I (forested, nonlethal). Surface and upper level winds within the airshed generally transport smoke away from the Impact Zone but this area may be impacted by smoke carried in from Airshed 14. Although this airshed has many other population centers, most are located along the western boundary. As with the Impact Zone, surface and upper level winds would generally carry smoke away from the population centers. However, there are a few communities, such as Lowman and Yellow Pine that are in close proximity to the boundary adjacent to vegetative communities in Fire Regime I (forested, nonlethal). As described for Airshed 14, all alternatives burn more acres in this fire regime than Alternative 1B in order to reduce hazardous vegetative conditions.

Impacts from past burning have been minor in this airshed due in part to favorable transport winds during spring and fall. However, limited ambient air quality data from the McCall and Garden Valley monitoring sites suggests that coordination during the burning period is necessary to reduce potential effects to the McCall Impact Zone and some population centers in the airshed. Air quality monitoring during the burning season conducted in previous years shows that air quality was generally "good" in the spring and fall though some days reached "moderate". In addition, in the past this airshed has had the highest average number of days when ignitions were restricted because of risks to air quality. Most of these occurred in the fall. It may be difficult to implement large areas of burning at one time based on data from past seasons. This may be of particular concern in the fall where there is potential to affect the McCall Impact Zone.

Airshed 16 – The risk of smoke-related impacts to population centers within this airshed is very low since the majority of the area is the Frank Church – River of No Return Wilderness and there is only one small population center in the airshed (Big Creek). Based on the existing Wilderness Management Plan, wildland fire use is the primary type of fire application. This type of burning occurs primarily the summer and is unpredictable as the timing, amount, and duration of smoke events vary from year to year. Large wildland fire use and wildfire events that occur near the northeastern boundary of the airshed have the potential to affect the Salmon Impact Zone in adjacent Airshed 17.

Airshed 17 – Most of the population centers immediately adjacent to the Ecogroup boundary are surrounded by vegetative types that burn less frequently than Fire Regime I (forested, nonlethal) (Figure AQ-14). Prescribed fire activities to reduce hazardous fuels may occur occasionally, but would not be as frequent as what might occur for areas surrounded by vegetative types in fire regimes that burned more frequently. In the spring, surface winds generally blow to the east, moving smoke across the airshed. In the fall, winds generally move from the south to the north, northeast. In the summer, winds generally blow from the south to north. Wildland fire use treatments in the Sawtooth Wilderness could impact adjacent communities. However, wildland fire use treatments in this Wilderness are generally small and of short duration. Although The Salmon Impact Zone is in this airshed, smoke from wildland fire use in eastern portions of the Sawtooth Forest would generally be transported away from population centers due to the speed and direction of upper level winds. However, surface and upper level winds could transport smoke from treatments at the southern end of the airshed toward the Sun Valley/Ketchum Impact Zone in Airshed 24.

Airshed 21 – Though much of this airshed is unpopulated, many of the communities that occur here, including Idaho City, Atlanta, Featherville, and subdivisions along the Highway 21 corridor, are adjacent to Fire Regimes I (forested, nonlethal), and II (non-forested, mixed) (Figure AQ-14). Smoke impacts to these communities are likely to occur under all alternatives due to the emphasis on reducing uncharacteristic wildfire hazard. The potential impacts to communities would be evaluated during project level planning for prescribed fire to determine compliance with the NAAQS. Appropriate mitigations would be instituted to reduce the potential for exceedances of the PM 2.5 NAAQS. In the past, prescribed fire activities have been implemented adjacent to these communities under the coordination of the Montana/Idaho Airshed Group. Although the magnitude and duration of smoke impacts can be minimized by this coordination in combination with other smoke management techniques, air quality levels for short time periods (one to two days) may reach "moderate" levels.

Based on the location of the Wildland Fire Use Planning Area and the prevailing surface and upper level winds, impacts from wildland fire use would be minimal to population centers located in the airshed since most are upwind of where the use is most likely to occur. However, wildland fire use on the Sawtooth Forest may affect the Sun Valley/Ketchum Impact Zone. Upper level winds in this area in the late summer and fall tend to flow across that portion of the Sawtooth toward this area.

Airshed 24 – The Sun Valley/Ketchum Impact Zone is an area of concern in this airshed due to its proximity to Ecogroup administered lands. About half the lands administered by the Sawtooth in this airshed fall within the boundary of the Impact Zone. Increases in burning on Ecogroup administered lands have the potential to affect this area. The season of poorest dispersion is winter, when fire use does not normally occur. However, average morning mixing heights in any season, particularly summer and fall, are generally poor indicating potential for accumulation during the night from residual smoke. Spring and fall surface winds may reduce the amount of smoke that accumulates as winds tend to blow toward the east, away from the communities. In the summer the winds shift, blowing from north to south over Ecogroup administered lands is toward the Sun Valley and Ketchum areas. However, upper level winds potentially carry smoke away from the Impact Zone in all seasons.

Airsheds 20, 25, and 1 – This large area contains several small communities and the Twin Falls Impact Zone. The Impact Zone is located to the north of the western-most Division of the Sawtooth. Based on the prevailing west to east-southeast wind direction that occurs in all seasons, smoke from fire use activities on Ecogroup administered lands would generally be carried away from the Impact Zone. This would also be the case for population centers like Burley and Heyburn that lie to the north of the Sawtooth Divisions. Communities located between the Divisions, such as Malta, Oakley, Elba, Almo, Yost, Clear Creek, may experience smoke impacts depending on the season. Wind direction varies throughout this area from spring, summer, and into fall which may carry smoke from Ecogroup administered lands into population centers. In addition, average morning mixing heights in some areas are poor, indicating the potential for residual smoke to accumulate during the night.

Cumulative Effects

Airshed 14 – Based on data from 1995 through 1999 smoke produced by Airshed Group members is the primary source. Even though the Montana/Idaho Airshed Group does not coordinate prescribed burning on almost half of the lands within this airshed, there does not appear to be a potential risk of impacts from other sources. The total average tons per year of

PM 10 emissions within counties containing Ecogroup administered lands is relatively low. Payette County is above the PM 10 threshold of concern (10,000 tons per year), but the Ecogroup does not administer lands in this county. The annual averages for PM 2.5 are similarly low for all counties though Payette County is again the highest.

From 1995 through 1999, PM 10 levels declined primarily due to reductions in Fugitive Dust. Fugitive Dust is the largest contributor of PM 10 and 2.5 in all counties followed by either Other Combustion or Agriculture and Forestry. There are also no point sources within the airshed. This further reduces the potential for fire use activities to conflict with other sources of emissions.

The potential to conflict with agricultural burners is also low based on estimated amounts of crop residue burning. Counties within this airshed have some of the lowest levels of burning for agricultural-related uses in the state. However, there may be some concern about smoke that could be transported into the airshed from upwind counties in Oregon though this has been minor in the past.

Airshed 15 – The risk of conflict with agriculture burning in this airshed is low based on past data as Valley and Boise Counties have had very low amounts of crop residue burning. Though the level in Idaho County was "moderate" in the past, areas that contribute to this county rating are located outside of the airshed. PM 10 emission trends for all counties have been improving while PM 2.5 trends show no change. Sources of emissions within the airshed are primarily from Fugitive Dust, Other Combustion, and Agriculture and Forestry. Improving PM 10 trends are primarily due to reductions in Fugitive Dust. There are no point sources within the airshed.

The overall risk of cumulative impacts to population centers is low based on the available emissions data. In addition, there are relatively low levels of burning conducted by burners other than those that make up the Montana/Idaho Airshed Group.

Airshed 16 – The risk of cumulative effects in this airshed is very low. Agricultural burning is low for all counties except Idaho, but the sources that contribute to the county level occur outside of the airshed. Annual average amounts of emissions are ranked among the lowest for counties within the area of consideration. PM 10 trends in all counties within the airshed have been improving due to reductions in Fugitive Dust. PM 2.5 trends generally show no change, though Lemhi County has shown slight improvement. Valley County average annual emissions are near the threshold of concern (10,000 tons per year), but emissions spiked in 1996 due to wildfires that temporarily increased emissions. This spike similarly influenced the average annual emissions for PM 2.5 and contributed to the relative high ranking. In addition, there are no major point sources within the airshed.

Airshed 17 – This airshed is managed primarily by burners who are members of the Montana/Idaho Airshed Group. This, in combination with the vegetative types being managed, reduces the potential for cumulative effects. In addition, crop residue burning is low to very low in the counties in this airshed. Counties in this airshed are ranked among the lowest in total annual average emissions and PM 10 trends for all counties have been improving. There are no major point sources located in this airshed. Overall, the risk of emissions impacts from cumulative effects is very low.

Airshed 21 – The potential for cumulative effects in this airshed is relatively low. The Ecogroup manages a large portion of the area, which decreases the chances of conflicting with other burners. Agricultural burning in the counties that make up this airshed is minor. PM 10 trends for Boise and Elmore County show improvement, primarily due to reductions in Fugitive Dust. Trends are also improving in Camas County though the data is skewed by a large increase in emissions in 1996 due to wildfires. However, average annual levels do not indicate a potential risk for cumulative effects. In addition, there are no point sources in the airshed.

Airshed 24 – The risk of impacts from cumulative effects in this airshed is low even though the Ecogroup manages only a small portion of the area. Agricultural burning in the counties in this airshed is low. PM 10 levels have been improving primarily due to reductions in Fugitive Dust; PM 2.5 levels have remained constant. There are no major point sources in the airshed.

Airsheds 20, 25, and 1 – In Airshed 25, although the Ecogroup administers a relatively small portion of the airshed, about 60 percent of the area in Idaho is managed by members of the Montana/Idaho Airshed Group. In 2002, Airshed members increased the amount of burning conducted in this airshed. In the future, coordination through smoke management programs will be key to reducing the potential smoke impacts, particularly at population centers.

Counties within and adjacent to these airsheds produce varying amounts of smoke from agricultural-related burning. Within the area of consideration, counties in these airsheds have the highest levels of crop residue burning. This suggests that there may be conflicts between burners for available burning windows. In addition, a number of the counties in the airshed contain point sources, which are another potential contributor of pollutants. The potential ramifications of the cumulative contribution of the Ecogroup to other sources are considered during project-level planning for prescribed fire, or as part of the implementation decisions for wildland fire use.

Other burners in Idaho are involved in a smoke management program. Practices developed through the Idaho Department of Agriculture and Department of Environmental Quality may further reduce the risk of potential cumulative impacts from emissions produced by multiple sources. PM 10 trends in counties adjacent to or containing Ecogroup administered lands have been improving primarily from reductions in Fugitive Dust. Dust currently accounts for the largest proportion (61 to 80 percent) of the annual emissions in these counties. This is also the case for PM 2.5.

<u>Alternatives to Burning and Emissions Reduction</u>

Alternatives provide various opportunities to reduce emissions through the use of mechanical rather than burning treatments. The differences between alternatives are based on the varying amount of area assigned to Management Prescription Categories, which provide the basis for determining opportunities. MPCs were assigned to Very Limited, Limited, and Not Limited Opportunity Groups based on potential limitations of the use of mechanical treatments defined by MPC theme, and standards and guides. Table AQ-20 displays the total acres in each alternative assigned to the various opportunity classes. On all three forests, Alternative 5 provides the most area in the Not Limited Opportunity Group and Alternative 6 followed by 4 provides the least amount of area in this group.

Table AQ-21 displays the percentage of acres treated with fire use in each opportunity group based on the vegetation modeling. For Alternatives 1B, 4, 6, and 7 the majority of the fire use is occurring in areas with Very Limited opportunities (Table AQ-21). Of these alternatives, Alternative 4 as opposed to 6 provides more opportunities as it has more area in Limited than the Very Limited Opportunity Group. The majority of the fire use in Alternative 3 on all three forests and Alternative 2 on the Boise is also occurring in areas with Limited as opposed to Very Limited opportunities.

Table AQ-20. Percentage of the Total Acres Assigned to Very Limited, Limited, and Not Limited Opportunity to Reduce Emissions Groups

Opportunity Group	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise NF							
Very Limited	23	29	19	53	10	71	42
Limited	37	61	77	47	37	23	40
Not Limited	40	14	4	0	53	6	18
Payette NF							
Very Limited	56	56	30	70	20	73	54
Limited	15	32	70	30	29	18	30
Not Limited	30	12	0	0	51	9	16
Sawtooth NF							
Very Limited	33	40	32	76	17	83	46
Limited	31	53	66	24	40	14	54
Not Limited	36	7	2	0	43	2	0

Table AQ-21. Percentage of the Total Forested Vegetation Fire Use Acres Occurring in the Very Limited, Limited, and Not Limited Opportunity to Reduce Emissions Groups

Opportunity Group	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise NF							
Very Limited	82	33	22	63	29	88	54
Limited	18	64	78	37	60	11	43
Not Limited	0	3	0	0	11	1	3
Payette NF							
Very Limited	92	74	42	70	61	91	76
Limited	7	25	58	30	33	8	22
Not Limited	2	2	0	0	5	1	2
Sawtooth NF							
Very Limited	96	57	44	92	45	92	76
Limited	3	43	56	8	32	8	24
Not Limited	1	0	0	0	22	0	0

Alternatives 5 and 1B provide the most amount of area in MPCs that facilitate mechanical removal of biomass (Table AQ-20). However, only a small amount of the total fire use acres over the first five decades are occurring in this Opportunity Group (Table AQ-21). For Alternative 5, which has the most area in the group with the Not Limited opportunities, only 11 percent of the total fire use on the Boise and 5 percent on the Payette occurs in this group. Mechanical treatments for meeting desired vegetative conditions and other forest-wide goals are the focus of this group and the primary use of fire here is to treat fuels produced by the mechanical activities.

Even though MPCs in the Not Limited and Limited Opportunity Groups facilitate treating mechanically rather than through burning, recent studies on the viability of small diameter utilization within Valley, Gem and Boise Counties show that haul costs and current transportation systems would be prohibitive. In addition, there is currently a lack of locally available business operations that utilize this sized material. Groups are working to overcome and develop local operations for small diameter material, but it is uncertain when and if they will become a large scale viable method for emissions reductions. While technologies are improving to remove and utilize biomass within the Ecogroup area, additional barriers exist before alternatives to burning using biomass removal are a feasible option.

Soil, Water, Riparian, and Aquatic Resources

INTRODUCTION

Management of soil, water, riparian, and aquatic resources includes some of the more significant issues, opportunities, and challenges for the three forests of the Southwest Idaho Ecogroup (Ecogroup). The Ecogroup has a variety of landforms, climates, and disturbance processes that over time have resulted in a complex array of landscapes. These landscapes offer a diversity of soils, streams, lakes, riparian, wetland, and aquatic ecosystems.

Aldo Leopold (1949) described the need to develop a science of land health and stated: "Health is the capacity of the land for self renewal". Managing for high quality soils, water, and soil-hydrologic function is fundamental in maintaining and restoring watershed health. Soil is the primary medium for regulating the movement and storage of energy and water, and for regulating cycles and availability of plant nutrients (ICBEMP 1997a). The physical, chemical, and biological properties of soils determine biological productivity, hydrologic response, site stability, and ecosystem resiliency.

The Ecogroup's diverse lithology, structure, and climate over time have resulted in a spatially complex pattern of landforms and associated soils of different physical and biological properties and processes that respond differently to management activities. Most management activities and natural disturbance processes—such as recent wildfires—stress soil resources to various extents. Impacts or indicators of stress include: surface erosion, compaction, and nutrient loss through removal of coarse woody debris, severe burning, flooding, and landslides. These effects may be of concern both onsite within the watershed uplands, offsite to aquatic resources within streams, or increase the post-wildfire risk to life, property and/or municipal supply watersheds associated with potential floods and landslides. Soil effects or stresses are not always detrimental or long lasting. In order to maintain and, where necessary, restore the long-term quality and productivity of the soil, detrimental impacts to the soil resource must be managed within tolerable limits.

The Forest Service commonly evaluates how proposed management activities meet requirements of the Clean Water Act (CWA) from a holistic perspective that considers land management activities occurring throughout the watershed and their effects on water quality and aquatic habitat integrity. The goal of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The increased listings of CWA Section 303(d) water quality limited water bodies (WQL Water Bodies) and development of Total Maximum Daily Loads (TMDLs) are symptomatic of the effects from historical and some ongoing management activities. Maintaining healthy watersheds and restoration of degraded watersheds will contribute towards the de-listing of impaired water bodies and to the survival and recovery of sensitive and listed aquatic species.

Productivity of soil and vegetation, proximity to water, and the general attractiveness of riparian and aquatic systems continue to make these areas ideal for many land uses managed by the Forest Service. Conflicts between these uses and the resources dependent on healthy, relatively undisturbed, riparian conditions may continue unless management provides for sufficient land use constraints and resource protection. It is the intent of Forest Plan revision to provide direction to minimize, if not resolve, these conflicts.

The variety of landscapes and associated aquatic ecosystems support an array of different aquatic, terrestrial, and botanical species. Population sizes and distribution of a number of these species have declined in recent decades, with several fish species afforded special protection under the Endangered Species Act (ESA). Aquatic species viability is dependant upon maintaining an array of well-connected, habitat conditions. Past management activities have contributed to fragmentation and degradation of habitat for fish and other riparian-dependent species. Humans have caused major changes in habitat conditions through such activities as timber management, livestock grazing, road and facility construction, mining, dams, recreation and introductions of hatchery and other non-native species. Future management activities have the potential for both additional impacts and restoration of these species and their habitats.

For aquatic species, the analysis looks at how the management alternatives for Forest Plan revision either contribute to or mitigate common threats to factors of decline within the influence of Forest Service management activities. Particular attention is paid to those species whose viability may be affected by the alternatives and their associated activities. Federal regulation 36 CFR 219.19 requires that viable populations of all native and desirable non-native vertebrate species be maintained at the planning area level. For a complete list of all native and non-native fish species that are common to the affected area, refer to the SWRA Technical Report. Species with a viability concern in this analysis include those listed or proposed for listing under the Endangered Species Act, those on the Regional Forester's sensitive species list, species at risk, and Forest Management Indicator Species for which populations and habitat conditions may be a concern. The degree that MPCs emphasize aquatic restoration or conservation and how well potential management effects are addressed will be central to the viability analysis.

Issues and Indicators

Issue Statement 1 – Forest Plan management strategies may affect the loss of soil-hydrologic function and long-term soil productivity from uncharacteristically lethal wildfire within highly vulnerable subwatersheds.

Background to Issue 1 - The *Preliminary AMS for the Southwest Idaho Ecogroup* (USDA Forest Service 1997) identified a need for management direction and emphasis that address important soil-hydrologic processes and natural and management-related disturbance processes (erosion rates, landslides, infiltration, nutrient cycling, etc.) as they relate to desired conditions and management of other resources. New information from the Interior Columbia Basin Ecosystem Management Project, and new research (Meyer et al. 2001, Moody and Martin 2001a and 2001b, Rieman and Clayton 1997, Benda and Dunne 1997) have linked accelerated soil erosion, loss of nutrient base, and triggering of floods, landslides, and debris flows uncharacteristic of their normal pattern and frequency, to uncharacteristically large and lethal stand replacing wildfires. This analysis looks at potential effects from such fires in subwatersheds that have high to extreme uncharacteristic vegetation hazards and high inherent vulnerability ratings. It is assumed that management strategies that reduce extreme or high vegetation hazards, thus lowering risk to uncharacteristic or lethal wildfires, would help reduce the potential for accelerated soil erosion, loss of nutrient base, and triggering of floods, landslides, and debris torrents.

Effects to coarse woody debris, an important contributor to soil productivity, are fully disclosed in the Vegetation Diversity section of this chapter.

Indicators for Issue 1 – The following analysis components were used to indicate and compare potential effects to this issue by alternative:

- Highly vulnerable subwatersheds that have high or extreme uncharacteristic forest vegetation hazard (PVG and current stand structure, density and composition)

- Management prescriptions (MPCs) that emphasize vegetation restoration treatments to reduce the risk of uncharacteristically lethal wildfire (2.4, 3.2, 4.1c, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2)

- MPCs that would likely have limited or no vegetation restoration treatments to reduce the risk of uncharacteristically lethal wildfire (1.1, 1.2, 2.0, 2.1, 2.2, 4.1 a, 4.1b)

Alternative MPCs were overlaid on subwatersheds having both high or extreme uncharacteristic forest vegetation hazard and high vulnerability to compare how the alternatives may potentially affect the risk of uncharacteristically lethal wildfire in these subwatersheds. The main analysis assumption was—the lower the risk, the lower the post-wildfire-related potential for soil erosion, loss of nutrient base, floods, landslides, and debris torrents over the long term.

Issue Statement 2 - Forest Plan management strategies may affect the number of subwatersheds considered at risk to post-wildfire floods and debris flows with potential effects to human life and property following uncharacteristically lethal wildfire.

Background to Issue 2 - Subwatersheds that have been identified as a potential risk to human life, property, and/or municipal supply watersheds from post-wildfire floods, landslides, and debris flows would likely require Burned Area Emergency Response (BAER) if an uncharacteristically lethal wildfire were to occur within them. One of the main objectives in implementing BAER measures is to alleviate emergency conditions following wildfire to mitigate significant threats to health, safety, life, or property (FSM 2523).

Recent information and research identifies the potential for post-wildfire accelerated soil erosion, flooding, and triggering of landslides uncharacteristic of their normal pattern and frequency following large uncharacteristic wildfire (Meyer et al. 2001, Moody and Martin 2001a and 2001b, Benda and Dunne 1997). Moody and Martin 2001b also identify that the geomorphic effects and responses to wildfire can be life threatening and may cause economically damaging floods, coupled with sediment impacts on recreation, aquatic biota, and water-supply systems. These potential impacts are especially a concern in subwatersheds that have a combination of high to extreme uncharacteristic vegetation hazards, high inherent vulnerability ratings, and the presence of human habitation, property, and/or municipal water supply watersheds. Management strategies (prescribed fire or mechanical vegetation treatment) that reduce these risks help reduce the post-wildfire threats and associated rehabilitation costs to these subwatersheds. The potential for using these types of strategies can be inferred from the MPCs that have been assigned to these subwatersheds by alternative.

Indicators for Issue 2 – The following analysis components were used to indicate and compare potential effects to this issue by alternative:

- Subwatersheds that have a combination of high to extreme uncharacteristic vegetation hazards, high inherent vulnerability ratings, and potential risk to human life, property, and/or municipal supply watersheds from post-wildfire floods, landslides, and debris flows.

- MPCs that emphasize vegetation restoration treatments to reduce the risk of uncharacteristically lethal wildfire (2.4, 3.2, 4.1c, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2)

- MPCs that would likely have limited or no vegetation restoration treatments to reduce the risk of uncharacteristically lethal wildfire (1.1, 1.2, 2.0, 2.1, 2.2, 4.1 a, 4.1b)

MPCs were overlaid on these subwatersheds to compare how the alternatives may potentially affect the risk of uncharacteristically lethal wildfire in these areas. The main analysis assumption was—the lower the risk, the lower the fire-related potential for soil erosion and landslides to affect human life, property, and/or municipal supply watersheds over the long term.

Issue Statement 3 – Forest Plan management strategies may have potential effects on soil productivity, accelerated soil erosion and sedimentation, water quality, riparian function, Total Maximum Daily Load (TMDL) water bodies, and listed Section 303(d) Water Quality Limited (WQL) water bodies.

Background to Issue 3 – Forest management strategies have the potential for producing both negative and positive effects to soil, water, and riparian resource conditions. Although the Forest Plans do not implement any specific activities, they do set the stage for them by assigning MPCs to Forest-administered lands that provide management emphasis, direction, and tools for future activities. These MPCs differ by alternative in this analysis. The Forest Plans also provide management direction in the form of standards and guidelines that are designed to protect and promote watershed resources. This analysis looks at both the potential impacts that could occur from management activities based on MPC allocation by alternative, and the potential benefits that could occur from watershed restoration emphasis inferred by the MPCs.

Potential Negative Effects - Land-disturbing management activities such as road construction, timber harvest, livestock grazing, recreation, fire use, and mining can decrease soil productivity through increased erosion and soil compaction, accelerate sedimentation and other pollutants, reduce riparian vegetation and coarse woody debris, damage stream banks, and alter water quantity, quality and temperature. All of these impacts can, in turn, negatively affect soil, water, and riparian conditions. Even though Forest Plan management direction would reduce the potential for impacts under all alternatives, there are different risks to these resources associated with varying amounts of land management activities by alternative. The management strategies for soil, water, and riparian resources are intended to prevent unacceptable impacts to these resources while allowing for appropriate levels of land management activities needed to achieve multiple resource goals and objectives.

Most negative effects associated with recreation, lands and special uses, non-native plants, and mineral activities are not anticipated to vary significantly by alternative and are addressed in the Effects Common to All Alternatives discussion of this analysis. The negative effects from rangeland resources, timberland/vegetation resources, road-related activities, motorized trail use, and fire management would vary by alternative. Therefore, specific issue indicators for these management strategies are outlined below.

Potential Positive Effects - Since the development of the original Forest Plans, numerous 303(d) water quality limited (WQL) water bodies have become listed as impaired under the Clean Water Act, and new assessments have been and are being developed to help determine appropriate water quality restoration plans. Watershed restoration is applied at various intensities under the Forest Plan alternatives to improve soil, water, and riparian conditions and help de-list subwatersheds with TMDLs or 303(d) WQL water bodies. There are approximately 50 subwatersheds within TMDL plans and 190 subwatersheds identified as containing portions of 303(d) WQL water bodies within the Ecogroup area.

Improvements in water quality and increased support of beneficial uses will assist in de-listing subwatersheds that have TMDLs or 303(d) WQL water bodies. These improvements should be more likely to occur when management direction is applied that emphasizes the appropriate watershed and aquatic restoration or conservation strategies. This analysis examines how management strategies considered would contribute to de-listing of TMDLs, 303(d) WQL water bodies by improving soil productivity, water quality, and beneficial uses.

Indicators for Issue 3 – The following indicators are used to measure potential effects to soil, watershed, and riparian conditions from selected management activities that may occur at different amounts and intensities, based on the MPCs assigned by alternative.

- *Potential Effects from Vegetation Treatments, Roads, and Fire Use*. Potential effects to soil, water, and riparian resources are analyzed through relative comparison by alternative of: (1) acres of MPCs that have suited timberlands by subbasin, and (2) the Equivalent Replacement Treatment (ERT) acres that are greater or less than thresholds of concern (TOC) by subbasin.

- *Potential Effects from Livestock Grazing*. Potential effects to soil, water, and riparian resources are analyzed through relative comparison by alternative of: (1) the amount of suitable rangeland acres by subbasin, and (2) the acres of MPCs that would result in less restrictive and more restrictive grazing management by subbasin.

- *Potential Effects from Watershed Restoration*. The following indicators are used to compare the potential beneficial effects of watershed restoration or conservation strategies in improving soil, water, and riparian conditions to fully support beneficial uses and assist in the de-listing of TMDLs and 303(d) WQL water bodies.

- Comparison of subwatersheds identified as a high WARS priority or ACS that have 303(d) water quality limited water bodies, and MPCs that emphasize the appropriate restoration/conservation strategies to assist in attaining full support of beneficial uses, thereby assisting in the de-listing of those water bodies.

- Comparison of subwatersheds identified as a high WARS priority or ACS priority subwatersheds that have TMDLs assigned, and MPCs that emphasize the appropriate restoration/conservation strategies to meet the intent of the TMDL plans.

Determination of appropriate restoration/conservation strategies is based on two general assumptions/criteria:

(1) The subwatershed's dominant type of restoration/conservation strategy identified by the Watershed and Aquatic Restoration Strategy (WARS) is appropriate, or a "good match" with the MPC restoration emphasis that is applied to that subwatershed, and/or

(2) The subwatershed has been identified as an ACS priority subwatershed that serves as an emphasis to initiate the appropriate watershed restoration identified for that subwatershed regardless of the MPC applied.

- *Potential Effects from Motorized Trail Use*. This indicator compares the potential effects from motorized trail use in recommended wilderness areas by alternative. Alternatives 4 and 6 would prohibit motorized use in these areas, but the other alternatives would allow current motorized use to continue. Other recreational uses would remain essentially the same for all alternatives.

Issue Statement 4 – Forest Plan management strategies may have potential effects on aquatic habitat and species, including species that are listed or proposed for listing under the Endangered Species Act, Region 4 sensitive species, species at risk, and Forest Management Indicator Species.

Background to Issue 4 - Forest management strategies have the potential for producing both negative and positive effects to aquatic species and habitat conditions. Although the Forest Plans do not implement any specific activities, they do set the stage for them by assigning MPCs to Forest-administered lands that provide management emphasis and direction for future activities. These MPCs differ by alternative in this FEIS. The Forest Plans also provide management direction in the form of standards and guidelines that are designed to protect and promote aquatic resources. This analysis looks at both the potential impacts that could occur from management activities based on MPC allocation by alternative, and the potential benefits that could occur from watershed and aquatic habitat restoration emphasis inferred by the MPCs. MPC indicators are intended to show relative differences between alternatives, rather than to represent the actual acres of disturbance or treatments that are expected to occur.

Potential Negative Effects - Land-disturbing management activities such as road construction, timber harvest, livestock grazing, recreation, fire use, and mining can decrease soil productivity through increased erosion and soil compaction, accelerate sedimentation and other pollutants, reduce riparian vegetation and coarse woody debris, damage stream banks, and alter water quantity, quality and temperature. All of these impacts can, in turn, negatively affect aquatic habitat and native and desired non-native fish species. Even though Forest Plan management direction would reduce the potential for impacts under all alternatives, there are different risks to these resources associated with varying amounts of land management activities by alternative. The management strategies for aquatic resources are intended to prevent unacceptable impacts to these resources while allowing for appropriate levels of land management activities needed to achieve multiple resource goals and objectives.

Most negative effects associated with recreation, lands and special uses, non-native plants, and mineral activities are not anticipated to vary significantly by alternative and are addressed in the Effects Common to All Alternatives discussion of this analysis. The negative effects from rangeland resources, timberland/vegetation resources, road-related activities, motorized trail use, and fire management will vary by alternative. Therefore, specific issue indicators for these management strategies are outlined below.

Potential Positive Effects - Since the development of the existing plans, several fish species have become listed under ESA, and interim land management strategies protecting anadromous (Pacfish) and resident (Infish) fish species have been amended into existing plans. Subsequent biological opinions (BOs) for bull trout, steelhead, and chinook have also amended the plans. The U.S. Fish and Wildlife Service has also developed draft recovery plans and proposed critical habitat for bull trout. Existing plans do not consistently support these new events and mandates. Watershed and aquatic restoration are applied at various intensities under the Forest Plan alternatives to pursue meeting the above direction.

Five species of native fish have been listed as Threatened or Endangered under the ESA. There are also two fish species on the Regional Forester's Sensitive Species List, and one species of special concern for the State of Idaho. These fish at risk are listed in Table SW-1, and they will be used in the effects analysis to represent effects to all aquatic species.

Improvement of TES and other native fish and aquatic habitat should occur when management direction is applied that emphasizes the appropriate watershed and aquatic restoration or conservation strategies. The analysis examines how restoration management strategies considered would positively affect the status of TES, fish species of special concern, and the distribution of populations and quality of habitat for MIS by improving water quality, beneficial uses, and various key habitat components.

Table SW-1. Listed and Sensitive Fish Species Within the Ecogroup Area

Fish Species	Status	Location by Forest
Sockeye salmon	Listed as endangered	Sawtooth
Spring/summer chinook salmon	Listed as threatened	All three Forests
Fall chinook salmon	Listed as threatened	Payette
Steelhead trout	Listed as threatened	All three Forests
Bull trout	Listed as threatened	All three Forests
Westslope cutthroat trout	Region 4 sensitive	All three Forests
Wood River sculpin	Region 4 sensitive	Sawtooth
Yellowstone cutthroat	Species of Special Concern in Idaho	Sawtooth

Indicators for Issue 4 – The following indicators are used to measure potential impacts to aquatic habitat conditions from selected management activities that may occur at different amounts and intensities, based on the MPCs assigned by alternative.

- *Potential Effects from Vegetation Treatments, Roads, and Fire Use*. This indicator compares the amount of suited timberland acres by subbasin, and the percentage of ERT acres with thresholds of concern (TOC) in subbasins for selected fish species by alternative. Those alternatives and subbasins with a higher amount of suited acres and ERT acres that exceed the TOCs would have greater potential for temporary and short-term impacts to matrix pathways.

- *Potential Effects from Livestock Grazing*. This indicator compares the amount (percent) of suitable rangeland acres, and the percent of each subbasin that allow less restrictive (4.1, 4.2, 5.1, 5.2, 6.1, 6.2) and more restrictive (1.1, 1.2, 2.1, 2.4, 3.1, 3.2, 4.3) MPC grazing strategies, in subbasins for selected fish species by alternative. Those alternatives and subbasins with a higher amount of suitable rangeland acres and MPCs with less restrictive grazing strategies would have a greater potential for temporary and short-term impacts to matrix pathways.

- *Potential Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard*. Potential effects to listed, sensitive, and special concern fish species were analyzed by comparing the MPCs (3.2, 4.1 c, 4.2, 4.3, 5.1, 5.2, 6.1, and 6.2) that have a high emphasis and more tools available to treat subwatersheds with high and extreme risks from uncharacteristic wildfire to MPCs (1.1, 1.2, 2.0, 2.1, 2.2, 3.1, 4.1a, and 4.1b) that have a limited emphasis and fewer tools available. This information was overlaid with the population status (e.g. strong, depressed, and isolated populations) of cutthroat, bull, and steelhead trout, Wood River sculpin, and chinook salmon to examine risks to those populations of treating vs. not treating vegetation. Specifically, the following scenarios were analyzed:

  - Potential impacts and benefits from management treatments in subwatersheds with uncharacteristic wildfire risks and depressed/isolated fish populations where assessed by subbasin. Under this condition, the risk of uncharacteristic wildfire in short-term is greater than the risk of mechanical and prescribed fire to treat vegetation in some situation where depressed or isolated local fish populations are present.

- Potential effects from the lack of management treatments in subwatersheds with uncharacteristic wildfire risks and depressed/isolated populations where assessed by subbasin. Under this condition, the risks from uncharacteristic wildfires would remain high potentially putting some depressed or isolated local fish populations at greater risk.

- Potential effects from management treatments in subwatersheds with uncharacteristic wildfire risks and stronghold fish populations where assessed by subbasin. Under this condition, the risks of mechanical and prescribed fire treatments are greater than the risk of uncharacteristic wildfire where strong populations are present.

- *Potential Effects from Aquatic Restoration*. This indicator is used to measure the potential beneficial effects of applying the appropriate active or passive watershed and aquatic habitat restoration or conservation strategies in improving aquatic habitat conditions and the status of TES, MIS, and fish species of special concern. It is also used to compare the potential negative effects from the lack of restoration to TES, MIS, and fish species of special concern in specific subbasins. Specifically, the following scenarios were analyzed:

  - Comparison of subwatersheds identified as a high WARS priority or ACS and MPCs that emphasize the appropriate restoration/conservation strategies. Those alternatives and subwatersheds with the appropriate or "good match" active restoration and passive restoration/conversation would have greater potential for improvement of fish habitat and populations over the long term.

  - Comparison of subwatersheds identified as a high WARS priority or ACS that have stronghold and depressed populations for sockeye and chinook salmon, and steelhead trout, and MPCs that emphasize the appropriate or "good match" active restoration and passive restoration/conservation of habitat and interconnectivity.

  - Comparison of subwatersheds identified as a high WARS priority or ACS that have stronghold, depressed, and isolated local populations for native westslope and Yellowstone cutthroat and bull trout, and MPCs that emphasize the appropriate or "good match" active restoration and passive restoration/conservation of habitat and interconnectivity.

  - Comparison of subwatersheds identified as a high WARS priority or ACS that have stronghold, depressed, and isolated local populations for Wood River sculpin, and MPCs that emphasize the appropriate or "good match" active restoration and passive restoration/conservation of habitat and interconnectivity.

  - Comparison of subwatersheds that have strong fish populations (chinook, steelhead, etc.) in high-risk (low Geomorphic Integrity and Water Quality Integrity) subwatersheds, with high or moderate priority for active restoration (WARS), but having a low MPC emphasis for active restoration.

- *Potential Effects from Motorized Trail Use*. This indicator compares the potential effects from motorized trail use in recommended wilderness areas. Alternatives 4 and 6 would prohibit motorized use in these areas, but the other alternatives would allow current motorized use to continue. Other recreational uses would remain essentially the same for all alternatives.

Affected Area

Issues 1, 2, and 3 - The affected area for direct and indirect effects to soil, water, and riparian resources are the lands administered by the three National Forests in the Ecogroup. This area represents the National Forest System lands where changes may occur to the soil, water, and riparian resources as a result of management activities or natural disturbance events. Some soil, water, and riparian issues and their indicators are analyzed at different spatial scales (subwatersheds or subbasins) and are then aggregated for the Ecogroup. Some issues and their indicators pertain to certain sets of subwatersheds while some pertain to all subwatersheds and are discussed at the subbasin scale to assist in the discussion of current conditions and effects of alternatives on fish species.

Subwatersheds are natural divisions of the landscape and the basic functioning units of hydrologic systems. Hydrologic watersheds are hierarchal, smaller ones nest within larger ones. Stream channels nest within subwatersheds, and their formation and function are in large part controlled by subwatershed physiography and geomorphic processes. Thus, the affected area for soil, water and riparian resources is not limited to just the hillslopes, stream channels, lakeshores, and defined riparian areas, but includes the whole subwatershed or subbasin. Management activities in one part of a subwatershed often influence other parts of that subwatershed, and to varying degrees, subwatersheds downstream of their respective subbasin.

Information for the description of the current condition and subsequent effects analysis was collected at the subwatershed scale and specific data and spatial map locations may be found in the SWRA Technical Report. This information can be aggregated to show relative conditions for the larger watershed, subbasin, Forest, or Ecogroup scales. Similarly, it can be stratified at the subwatershed or subbasin scale to show conditions or effects in specific drainages of interest, such as the South Fork Salmon River or Middle Fork Salmon River.

The affected area for soil, water, and riparian cumulative effects varies by Issue. For Issue 1, the affected area for cumulative effects includes the lands administered by the three National Forests in the Ecogroup and lands of other ownerships within the National Forest boundaries. The cumulative effects to soils are generally limited to the immediate area of any management activity.

For Issue 2, the affected area for cumulative effects increases to include those portions of subwatersheds not wholly within and downstream of the National Forest boundaries. Management activities occurring on NFS lands may have downstream effects within subwatersheds that extend off-Forest. These effects may change the post-wildfire risks to human life, property, and municipal supply watersheds on both the on-Forest and off-Forest portions of these subwatersheds. For Issue 3, the affected area for cumulative effects increases to include those portions of subwatersheds and subbasins not wholly within and downstream of the National Forest boundaries. Management activities occurring on NFS lands may have downstream effects within subwatersheds and subbasins that extend off-Forest. These effects may change the water quality status related to 303(d) water quality limited water bodies or TMDLs on both the on-Forest and off-Forest portions of these subwatersheds and subbasins.

Issue 4 - The affected area for direct and indirect effects to aquatic species is land administered by the three National Forests that make up the Southwest Idaho Ecogroup. The Forests contain waters that are part of the Salmon River Basin and the Snake River Basin upstream of the Salmon River confluence, which contains the Boise, Payette, Weiser, Wood, and Raft River systems and the Hells Canyon, Brownlee Reservoir, Upper Snake-Rock, Goose Creek and Salmon Falls Creek subbasins. Potential effects to aquatic fish species and their habitat would originate within the Forest boundaries in these drainages.

The affected area for cumulative effects varies by species. For anadromous species (sockeye, spring/summer and fall chinook, steelhead), the affected area encompasses all areas in the Salmon River Basin and Hells Canyon subbasin potentially affected directly or indirectly by the Federal Action and adjoining subbasins where there is a high potential for straying and recolonization by fish originating within the Ecogroup. The Pahsimeroi, Lemhi, and Middle Salmon-Panther subbasins are included in the environmental baseline for this reason.

For Columbia River bull trout the affected area encompasses all areas in the Salmon River Basin (Salmon Basin Recovery Unit), Weiser, Payette, and Boise River Basins (Southwest Idaho Recovery Unit), Brownlee Reservoir subbasin (Hells Canyon Recovery Unit), and Hells Canyon subbasin (Imnaha Recovery Unit) potentially affected directly or indirectly by the Federal Action and accessible adjoining subbasins within where there is a high potential for straying and recolonization by fish originating within the Ecogroup.

For westslope cutthroat, the affected area encompasses all areas in the Salmon River Basin potentially affected directly or indirectly by the Federal Action and adjoining subbasins within where there is a high potential for straying and recolonization by fish originating within the Ecogroup. The Pahsimeroi, Lemhi, and Middle Salmon-Panther subbasins are included in the environmental baseline for this reason.

For Wood River Sculpin, the affected area encompasses all areas in the Camas, Big Wood and Little Wood subbasins potentially affected directly or indirectly by the Federal Action.

Finally for Yellowstone cutthroat, the affected area encompasses all areas in the Upper Snake-Rock, Raft River, and Goose Creek subbasins potentially affected directly or indirectly by the Federal Action and accessible adjoining subwatersheds within each subbasin where there is a high potential for straying and recolonization by fish originating within the Ecogroup.

Figure SW-1. Affected Area Boundaries for Analyzed Fish Species

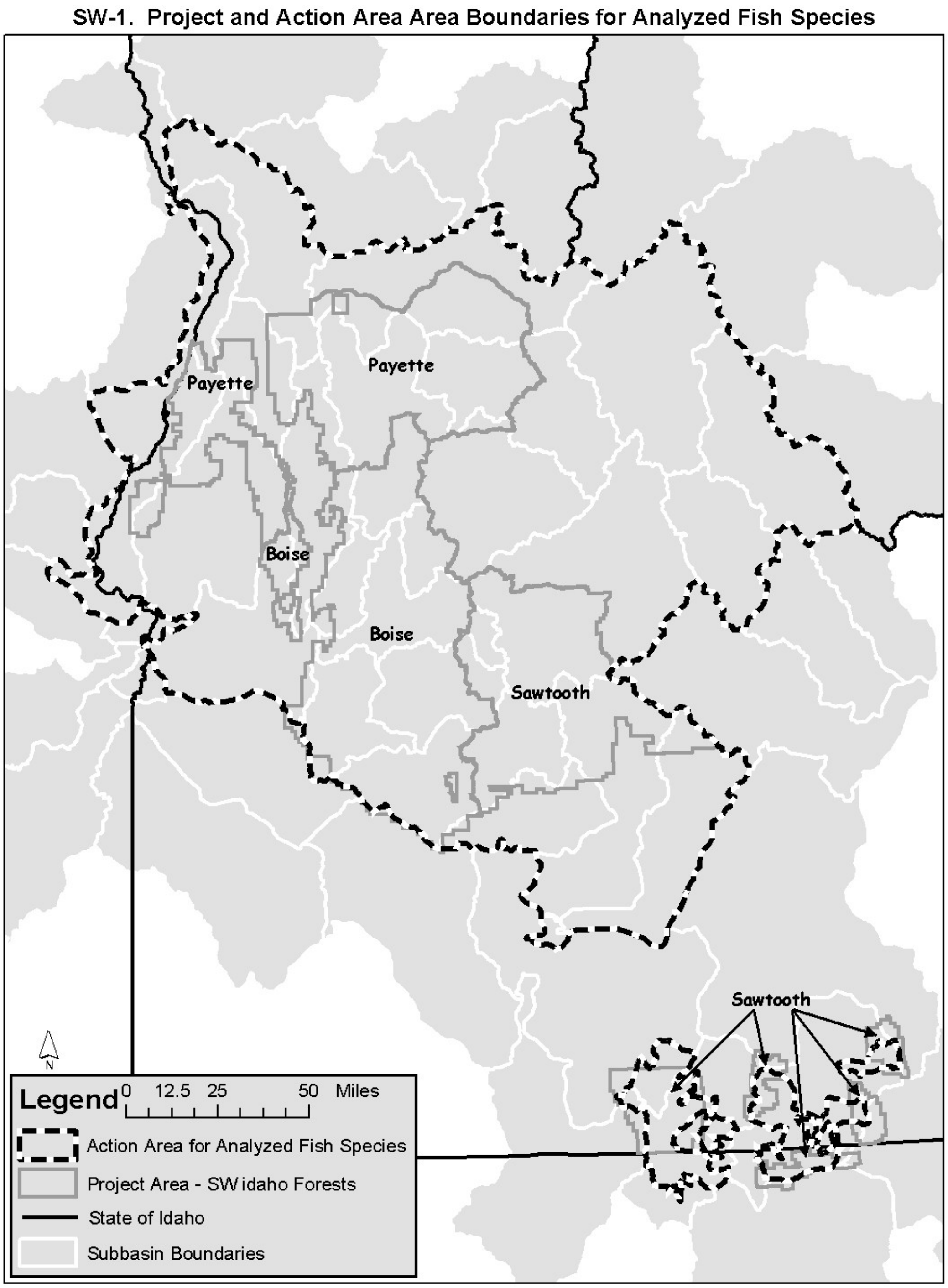
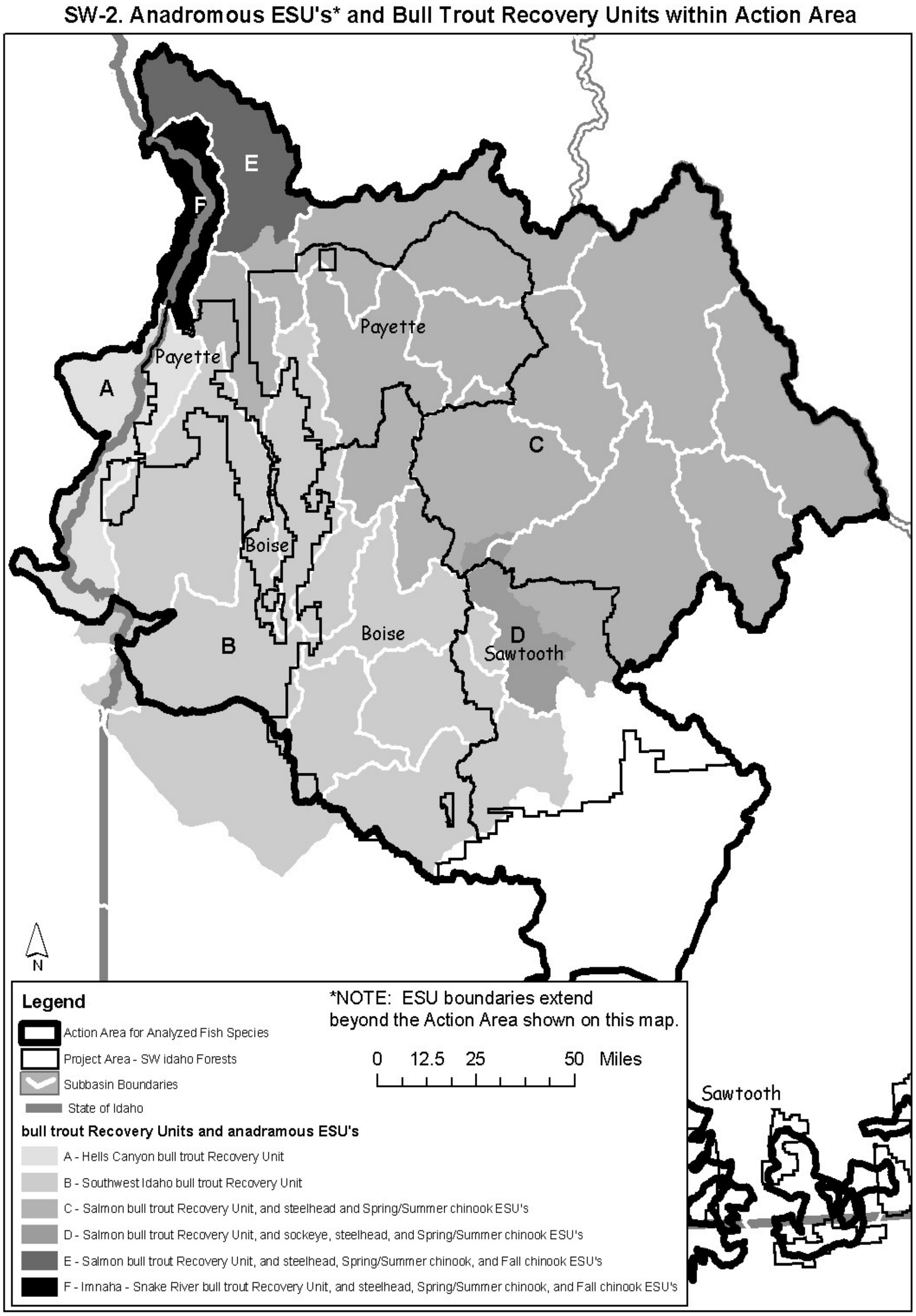


Figure SW-2. Anadromous ESUs and Bull Trout Recovery Units Within the Affected Area



CURRENT CONDITIONS

Overview

Land and Watershed Stratification

Biophysical conditions within the Ecogroup area are tremendously varied, dynamic, and complex. To assess terrestrial and aquatic systems, it is important to consider the past, current, and future states of the physical and biological components of the landscape comprising these systems. To gain such knowledge requires that terrestrial and aquatic physical and biological patterns at different spatial scales be characterized to meet forest-planning needs. This approach allows the evaluation of broader-scale influences on finer-scale conditions and processes, and uses finer-scale information to determine the significance of broader-scale influences.

The ecological linkage between the terrestrial (land) unit and aquatic unit (watershed) characterizes and assesses watersheds on the basis of geoclimatic setting in which they are found. Understanding the relationships that exist between land and aquatic systems is key to predicting their response to natural or anthropogenic disturbance and their rate of recovery. Hierarchical delineation of watersheds provide a systems approach that includes not all of the constituent parts, but also the links, relations, interactions, consequences, and implications among these parts (USDA Forest Service 2000).

The Ecogroup area has been stratified into progressively smaller land units of increasingly uniform ecological processes and potentials following the National Hierarchical Framework of Ecological Units adopted by the Forest Service (USDA Forest Service 1993). The stratification system uses seven levels. The first two levels called Domains and Divisions are largely based on global and continental climate patterns. The third level, called Provinces, is based on broad vegetation zones that conform to continental climate patterns and similar soil orders. Geomorphic processes, geology, topography, soil groups, and potential natural communities are used to stratify the fourth and fifth levels, called Sections and Subsections. There are 6 sections and 51 subsections partially or wholly within the Ecogroup area. The next two levels are landtype associations and landtypes. General topography, geomorphic processes, surficial geology, soil and potential natural community patterns, and local climate are used to stratify these levels. These factors affect biotic distributions, soil-hydrologic function, natural disturbance regimes, and general land use. At this level, terrestrial features and processes may have a strong influence on ecological characteristics of aquatic habitats (USDA Forest Service 1993, Platts 1979). The landtype association and landtype scales were the main land units used to assist in describing the current condition and effects analysis for the SWRA resources. There are 98 landtype associations and 465 landtypes partially or wholly within the Ecogroup area.

The Ecogroup has been stratified into progressively smaller watershed units of increasingly uniform ecological processes and potentials following the Hierarchical Framework of Aquatic Ecological Units in North America (Maxwell et al. 1995). The stratification system has eleven levels, from a very large scale (subzones) down to a very fine scale (channel units). This analysis mainly used three scales: river basins, subbasin, and subwatershed. River basins are defined by the presence of unique species assemblages, and often one or more endemic aquatic species. Each basin has barriers to species dispersal caused by climate change, oceans, hydrographic divides, or other factors. River basins may be divided into subbasins based on criteria that define different physical-chemical patterns in the habitats of distinct species groups. Subbasins are divided into smaller watershed and subwatershed units using hydrographic criteria. Subwatersheds were used to reduce the variability in describing natural and anthropogenic disturbance, inherent vulnerabilities, and current conditions for the SWRA resources. Where appropriate, the subwatersheds were aggregated to describe their respective subbasin conditions and effects from the alternatives. There are 29 subbasins and over 650 subwatersheds partially or wholly within the Ecogroup.

Soils and Soil Productivity

For the thousands of years prior to Euro-American settlement, disturbances to soils were limited to climatic and wildfire changes leading to natural-occurring surface erosion and landslide processes, or increased erosion after wildfires. Fires set by Native American Indians also had an influence on the soils resource, although this is assumed to have had a relatively small effect within the Ecogroup area. Following these events, elevated erosion rates decreased relatively rapidly through natural revegetation. The soil was compacted or kept bare in only very small areas, such as village sites or heavily used trails. After Euro-American settlement of the Ecogroup area, human-caused activities resulting in soil disturbance and accelerated erosion increased and included hydraulic and other mining activities, livestock grazing, timber harvest, road construction, and more recently, increased uncharacteristic large and lethal wildfire.

Mining has caused severe but localized impacts to soil and water, particularly where some streams were dredged, or hillsides adjacent to streams were deliberately eroded to expose gold deposits. Early timber harvest, and any associated soil disturbance, was generally limited to areas surrounding settlements because of limited methods to transport logs. Later, with railroads used to transport logs, soil disturbance due to logging extended further into the surrounding forests. Livestock grazing through the late 1800s and early 1900s caused extensive loss of protective vegetative ground cover that led to accelerated soil erosion. These effects were more prominent on rangelands and high-elevation broad ridges. Generally, most of the more resilient north-to-east aspects have revegetated, while many of the south-to-west aspects with vulnerable soil types have accelerated soil erosion due to a lack of protective vegetative ground cover.

After World War II, the area harvested for timber increased dramatically within more accessible areas of the Ecogroup. In some areas, road densities and ground-based harvest operations contributed to accelerated soil erosion, landslides, loss of coarse woody debris, and soil compaction. Since the 1970s, best management practices implemented to reduce loss of soil productivity and to maintain water quality have increased in amount, variety, and effectiveness. More recently, the Intermountain Region of the Forest Service established Soil Quality Standards to address protection and maintenance of long-term soil productivity.

In the past 10-15 years, there has been an increase in uncharacteristically large and lethal wildfires within certain potential vegetation groups of the Ecogroup (USDA Forest Service 1996). In many severely burned areas, soil productivity and other SWRA resources have been extensively degraded. This has led to an increase in post-fire soil erosion and flooding, as well as loss of coarse woody debris needed for nutrient recycling. These effects are of particular social concern within urban-rural wildland interface areas and in subwatersheds that have been identified as having potential impacts to human life, property, and/or municipal supply watersheds from post-wildfire floods, landslides, and debris flows. The cost of suppressing these wildfires and rehabilitating watersheds to reduce the post-wildfire threat to life, property and/or municipal supply watersheds, loss of long-term soil productivity, and deteriorated water quality has greatly increased (USDA Forest Service 2000, Pacific Watershed Associates 1998, State of Idaho 1997).

Recent scientific research supports the concern that altered vegetation conditions within certain vegetation types poses an increased risk to soil-hydrologic processes and overall watershed condition. However, scientific debates continue as to the trade-offs and associated risks of reintroducing fire and mechanical vegetation treatments to reduce ecological risks to vegetation and potential effects to other soil-hydrologic and aquatic resources (Meyer et al. 2001, Moody and Martin 2001a and 2001b, Gresswell 1999, Rieman and Clayton 1997, Benda and Dunne 1997). These tradeoffs will be discussed later in this analysis.

Water and Riparian Resources

Of all aquatic habitats, streams show the greatest and most intensive interaction with their terrestrial forestland (Hynes 1975). Streams are products of their catchments, and their environmental conditions and biotic communities are strongly influenced by the nature and state of the surrounding lands within a catchment or basin (Naiman et al. 2000). The adjacent streamside (riparian) environment is the principal interface between the terrestrial uplands and streams.

Riparian areas, wetlands, and associated floodplains comprise a relatively minor percentage of the total Ecogroup land base, but are more productive in terms of plant and animal diversity and biomass per unit area than the remainder of the land base combined (USDA Forest Service 1992). Healthy and properly functioning riparian areas, wetlands, and floodplains are physically and biologically diverse and highly productive environments. These land-water interfaces are generally very dynamic and support complex associations of plant and animal communities. They also help purify water, moderate impacts of flooding, collect rain and snow runoff, and replenish water needed to sustain vegetation and other riparian functions. These areas are also attractive for recreation, livestock management, roadways, and other human uses.

The importance of properly functioning riparian, wetland, and floodplain systems cannot be overstated. With the right composition and condition of vegetation, properly functioning riparian areas, wetlands, and floodplains stabilize and rebuild streambanks, capture sediments and other pollutants, store water to be released during low-flow times of the year, create pools and undercut banks for fish, keep water temperatures within acceptable ranges, provide large woody debris for pool development and sediment entrapment, provide for a diversified range of succession and plant species, and contribute to nutrient cycling. By filtering sediments and other impurities, these systems greatly contribute to high-quality water. Also, properly functioning riparian, wetland, and floodplain systems are dynamic and more resilient to disturbances from natural and human-caused events than impaired systems.

An estimated 25,000 miles of perennial and intermittent streams occur within the Ecogroup, of which essentially all perennial and some intermittent streams are fish bearing. There are an estimated 34,000 acres of lakes and reservoirs occurring within the Ecogroup. Forest streams comprise the headwaters of several important river systems, including the Snake, Salmon, Boise, Payette, Raft, Big Wood, and Weiser Rivers. Annual water yield for the Ecogroup is estimated at 10.4 million acre-feet (see the SWRA Technical Report for more detailed information).

Water originating on and moving through the Ecogroup area provides for many, often conflicting, uses. Many people depend on the Ecogroup Forests to provide water for irrigation, municipal supply use, recreational, and hydropower. Water bodies, riparian areas and wetlands also provide prime recreation sites for fishing, rafting, camping, municipal supply watersheds, and other uses. These same areas provide habitat for a variety of aquatic and riparian-dependant resources, including TEPS aquatic and wildlife species.

One of the primary missions of the Forest Service is to provide high-quality water in sufficient quantities and quality to meet all needs of natural resource and human requirements (Organic Act, 1897; Federal Water Pollution Control Act and Clean Water Act as amended, Endangered Species Act 1973, National Forest Management Act of 1976; USDA Forest Service 2000). Because many stream and river systems within Idaho originate within the Ecogroup boundaries, it is imperative that the Forests emphasize proper management to ensure that an appropriate quantity of good, clean water is provided to meet these needs. Ecogroup water bodies currently vary from pristine condition to heavily polluted from human activities and from disturbances associated with ecological processes, such as wildfire and landslides. Certain water bodies have been listed by the State as impaired under Section 303(d) of the Clean Water Act, and the Forest Service is obligated to work with the State to reduce pollutants (often sediment) so that these water bodies can eventually fully support their beneficial uses and be de-listed by the State of Idaho DEQ.

Aquatic Species

Fish are the dominant aquatic vertebrates and constitute a key component of aquatic ecosystems within the Ecogroup. Fish are a critical resource to humans and have influenced the development, status, and success of social and economic institutions. Fish are sensitive to disturbance to soil and water related resources and may be directly or indirectly effected. The diversity and integrity of native fish communities provide useful indicators of aquatic ecosystem structure, function, and health.

Many aquatic fish species have evolved in concert with the dynamic nature of stream channels and the watersheds in which they flow. They have developed traits, life-history adaptations, and propagation strategies that allow for their persistence and success within the varied landscapes and associated disturbance regimes. The varied characteristics and distribution of native fishes mirrors the diverse and dynamic geoclimatic setting within the Ecogroup. Native fish fauna habitat within the Ecogroup is composed of portions of 29 subbasins and over 650 associated subwatersheds. As many as 50 different native and non-native species of fish inhabit the Ecogroup rivers, streams, and lakes (see Watershed and Aquatic Technical Report for entire list).

In addition, the Forests manage habitat for a number of fish species listed under the ESA, or designated by the Regional Forester as sensitive species. There are five listed fish species within the Ecogroup area. These include bull trout, steelhead trout, and spring/summer chinook, fall chinook, and sockeye salmon. Bull trout, listed as threatened under the Endangered Species Act, has been selected as a management indicator species for the revised forest plans for each Forest (see Appendix F). Westslope cutthroat and Wood River sculpin also occur within the Ecogroup area and are identified by the Forest Service as sensitive species.

SWRA Resources Analysis Components

The following descriptions of key terms and concepts are crucial in understanding both the descriptions of SWRA current conditions and the SWRA Environmental Consequences Section. Many of these key terms and concepts are used as indicators or components of indicators used for describing and evaluating effects of the Issues. The key terms and concepts will also be identified as to which issue or issues they are associated.

Data Information And Sources

Data and information sources included the results from the Ecogroup multi-scale subbasin and subwatershed PFC assessments. This analysis centered on obtaining current conditions and causes for SWRA resources while integrating the soil-hydrologic function, dynamic stream equilibrium, associated aquatic habitat, and status of listed and native fish populations for each subbasin and their respective subwatersheds. The subwatershed conditions were then aggregated up to and compared at the subbasin. The watershed and aquatic recovery strategy database incorporates most of the data collected and analyzed as part of the multi-scale PFC assessments. The multi-scale PFC assessments laid the groundwork for the development of the comprehensive Aquatic Conservation Strategy that was used in the development of management direction to support the objectives and requirements of the ESA, CWA, and other fish and water quality statutes.

Soil, water, riparian, and aquatic information from the ICBEMP was used to help develop the Need For Change topics, issues, reference conditions, restoration strategies, and management direction in the revised Forest Plans. The ICBEMP data for the soil, water, riparian, and aquatic resources for the Ecogroup was also reviewed for use in describing current subwatershed and subbasin conditions. However, revision team specialists were able to obtain more site-specific, local, and recent data for the Ecogroup that were more appropriate than the lower resolution data sets used in the ICBEMP project.

Fisheries databases used in this analysis are at the same scale as those used by the ICBEMP, but the revision team had more recent data at the subwatershed and subbasin scales than the fisheries data compiled and used by the ICBEMP. Soil and watershed databases used by the ICBEMP were on a much broader scale than data available to the revision team. Data used for the Revision, for instance, include more specific landtype and landtype association data, and a more recent updated list of 303(d) impaired water bodies. Additional sources—including road inventories and landslide-prone area mapping—also utilized more specific, local data. Field specialists in the soil, water, riparian, and aquatic resource areas were integral in identifying data for determining current subwatershed conditions, some of which were available through the Inland West Watershed Initiative.

Data from the watershed and aquatic recovery strategy database were used to identify fish strongholds, presence/absence, spawning/rearing habitat, migratory habitat, and bull trout and cutthroat isolated local populations at the subwatershed scale. This information was compiled for the database over the course of developing the revised Forest Plans from surveys and through discussions with biologists at the District and Forest levels. Where previous BAs exist and provide information on presence, status, trends and threats regarding the listed fish, they were used to supplement the multi-scale analyses. The information in these BAs generally came from Forest surveys and inventories. In cases where information was limited, other sources—for example, the FWS bull trout draft recovery plan (USDI FWS 2002)—were used. Refer to the SWRA Technical Report for more detailed discussion on the data and information sources.

Subwatershed Vulnerability Rating (Issues 1, 2, 3, and 4)

Subwatershed vulnerability ratings characterize the natural inherent sensitivity of subwatershed to disturbance, also called vulnerability. The vulnerability is correlated to a threshold of concern (TOC) based upon relative ranges of sensitivity. The more vulnerable a subwatershed or subbasin is to disturbance (natural or anthropogenic), the lower the TOC (Menning et al. 1996). In highly vulnerable subwatersheds, disturbances pose a higher risk of degrading soil-hydrologic, stream dynamic equilibrium, and riparian functions or ecological processes compared to subwatersheds with low vulnerability ratings. Subwatershed vulnerability also relates to the natural resiliency or ability for renewal (restoration) once the subwatershed experiences disturbance. The more inherently stable and highly productive the soils in the subwatershed, the better suited it is for self-recovery of watershed conditions. Highly vulnerable subwatersheds have a high percentage of sensitive lands. Sensitive lands are defined as having combinations of inherently highly erodible soils, high natural sediment yields, and high percentages of landslide prone areas. See the Aquatic Biological Assessment and the SWRA Technical Report for more detailed information on data and analysis methods.

High and Extreme Forest Vegetation Hazard Rating (Issues 1 and 2)

Uncharacteristic wildfire hazard is defined as the effect of wildfire on the vegetative conditions when it burns (rather than if it will burn) described by potential vegetation group (PVG), size class, and canopy closure for forested vegetation, or cover type and canopy cover for non-forested vegetation, relative to the historical effect. Hazard is based on the vegetative conditions that influence fire behavior and potential effects (Bachmann and Allgöwer 1999, Deeming 1990). The hazard ratings are low (0), moderate (1), high (2), and extreme (3). Subwatersheds that have a hazard rating of high or extreme were used in the analysis for Issues 1 and 2. Further discussion on uncharacteristic wildfire hazard ratings is located in the Vegetation Hazard section in Chapter 3 of this FEIS.

Municipal Supply Watersheds (Issues 2, 3, and 4)

Several communities depend on water from subwatersheds within the Ecogroup. The objective of the three National Forests within the Ecogroup is to mange for multiple uses by balancing present and future resource use with domestic water supply needs (Forest Service Manual 2542). The definition of a municipal supply watershed is one that serves a public water system as defined in Public Law 93-523 (Safe Drinking Water Act); or as defined in State safe drinking water regulations. The definition does not include communities served by a well or confined ground water unaffected by Forest Service activities (Forest Service Manual 2542.05).

Subwatershed Geomorphic Integrity (Issues 3 and 4)
Current conditions for soils at the subwatershed scale were determined through geomorphic integrity ratings. Geomorphic integrity ratings (GIR) for each subwatershed are intended to judge the current condition of the upland soil-hydrologic processes and functions and stream-dynamic equilibrium based on past and current (natural or anthropogenic) disturbances as compared to historical conditions (pre-euro-American settlement). Rating determinations are based on the ability of subwatershed soil-hydrologic conditions to function as a sponge-and-filter system to absorb and store inputs of water, and on geomorphic resilience of streams, and riparian and wetland areas. Both natural and anthropogenic disturbances were used to estimate existing geomorphic conditions of each subwatershed.

Geomorphic integrity conditions were assigned three relative ratings (high, moderate, and low). These ratings equate to the properly functioning condition terms used in the Matrix of Pathways and Watershed Condition Indicators in Appendix B of the revised Forest Plans. The ratings may also be expressed in terms of the baseline condition. In other words, a high integrity represents a good condition or one that is functioning appropriately. The following descriptions are designed to help the reader understand these relationships. The individual subwatershed GIR were aggregated up to their respective subbasin to assist in determining the overall subbasins' watershed condition for the soils resource.

- **High Integrity** - the subwatershed is in good condition, near or at properly functioning condition, and has low risk from further disturbance. Rating is Functioning Appropriately.

- **Moderate Integrity** - the subwatershed is in fair condition, functioning at risk, and has moderate risk from additional disturbance. Rating is Functioning at Risk.

- **Low Integrity** - the subwatershed is in poor condition, not properly functioning, and has high risk from additional disturbance. Rating is Functioning at Unacceptable Risk.

Data to determine GIR by subwatershed were (see the SWRA Technical Report for description of data sources and maps used to display GIR):

1. Total miles of road (classified and unclassified) per square mile of subwatershed
2. Ratio of LSP area (Moderate and High Landslide Potential): to roads on LSP (density)
3. High Intensity Historic Fires (include fires since 1980 over 300 acres)
4. Timber Harvest History
5. Determination of percent of Equivalent Clearcut Acres (wildfires, and timber harvest)
6. Professional judgment and local knowledge (Mining, Grazing, Recreation, Landslides/debris torrents etc).

Subwatershed Water Quality Integrity (Issues 3 and 4)
Current conditions for the water and riparian resources were determined through water quality integrity (WQI) ratings at the subwatershed scale. A WQI rating is largely based on past and current (natural or anthropogenic) disturbances. Ratings result from the cumulative effects of localized physical problems—such as poorly constructed roads, mineral activities, failed culverts, and landslides—or dispersed sources such as areas of extensive grazing, timber harvest, road

construction or wildfire. The ratings determine the streams and riparian water quality relative to their potential, or if damage to stream segments is extensive or intensive enough such that any designated beneficial use is not fully supported or any resource value is seriously degraded. Stream segment conditions include physical, chemical, or biological impacts, including the following categories: bank damage, sediment loads, channel modification, flow disruption, thermal changes, chemical contamination, and biological stress.

Damaged stream segments are those in which physical, chemical, or biological impacts associated with natural or anthropogenic disturbances have caused any designated beneficial use to be not fully supported or any water-related resource value to be substantially degraded. It is important to note that this determination is based on direct or indirect effects within or affecting the stream channel, just as the Geomorphic Integrity is associated with the hillslopes and processes of the surrounding subwatershed outside of the stream channel.

Designated beneficial uses are any of the various uses which may be made of the water of an area, including, but not limited to 1) agricultural water supply; 2) industrial water supply; 3) domestic water supply; 4) cold water biota; 5) primary contact recreational use; 6) secondary contact recreational use; 7) salmonid spawning, over-wintering, emergence, and rearing; and 8) warm water biota.

Water quality integrity conditions are assigned three relative ratings (high, moderate, and low) previously discussed in the section on Subwatershed Geomorphic Integrity. Data to determine WQI ratings by subwatershed are identified below (see the SWRA Technical Report for more description of data sources and maps used to determine water quality integrity):

1. Miles of road (classified and unclassified) within subwatersheds RCA (both intermittent and perennial streams)
2. Number of road stream crossings (classified and unclassified and both intermittent and perennial streams)
3. Occurrence of any identified damaged stream segments
4. Identification of a 303(d) impaired water body
5. Professional judgment and local knowledge (roading, timber harvest, mining, grazing, recreation, landslides/debris torrents etc).

Watershed and Aquatic Recovery Strategy (WARS) (Issues 3 and 4)
The process of choosing a restoration or conservation strategy begins with a determination of whether the subwatershed components are functionally intact, or whether the components are damaged by management activities and/or natural processes to the extent that it cannot restore itself to regain its former characteristic functions and processes within an acceptable time period (Wissmar and Beschta 1998). Restoration prioritization was largely based on the principles identified by the interagency restoration team described in Restoration Task Team (2000).

Appropriate Type of Subwatershed Restoration/Conservation - The use of subwatershed geomorphic integrity (GI), water quality integrity (WQI), and subwatershed vulnerability ratings served as a basis for determining if subwatershed components are damaged and if so, whether it has the capacity to restore itself naturally (resiliency) to a desired condition and within an acceptable time period (rate of recovery). These ratings are used to determine the dominant type of restoration or conservation strategies most suitable for each subwatershed. The aquatic integrity (AI) information also assists in determining the subwatersheds restoration prioritization.

SWRA resource restoration is viewed overall as the movement of subwatershed functions, ecological processes, and structures toward desired conditions. The intent of the watershed restoration direction is to recognize the variability of natural systems while: (1) securing existing habitats that support the strongest populations of wide-ranging aquatic species and the highest native diversity and geomorphic and water quality integrities; (2) extending favorable conditions into adjacent subwatersheds to create a larger and more contiguous network of suitable and productive habitats; and (3) restoring soil-hydrologic processes to ensure favorable water quality conditions for aquatic, riparian, and municipal beneficial uses that will fully support beneficial uses and contribute to the de-listing of fish species and 303(d) water quality limited water bodies.

For this process, restoration approaches were divided into two categories: restoration (two types: active or passive) or conservation. For each subwatershed, a determination was made about the appropriate type of approach: active restoration, passive restoration, or conservation. This was done based on the assessment of the biophysical components and other information in the WARS database. Determining the type of approach does not infer that it is the only type of restoration needed; rather it is the dominant most appropriate restoration within a given subwatershed.

Subwatersheds with GI and WQI rated as Functioning Appropriately are appropriate for either a passive restoration or conservation approach, as these subwatersheds are estimated to be in very good geomorphic and water quality condition. However, the conservation approach was assumed to be more appropriate for subwatersheds with strongholds of threatened or endangered fish species. Subwatersheds with GI and WQI rated as Functioning At Risk or Functioning At Unacceptable Risk are appropriate for an active restoration approach, as these subwatersheds are estimated to be in fair to poor geomorphic and water quality condition. Some adjustments in determining the type of restoration were made based on the subwatershed's vulnerability rating (resiliency). See the SWRA Technical for further descriptions on how these adjustments were determined.

Subwatershed Restoration Priority - Findings in the ICBEMP Assessment identified there were more restoration needs than reasonably foreseeable levels of budgets, activities, and staff. In order to make a difference at a landscape scale, a strategically focused restoration effort is needed (Restoration Task Team 2000, USDA Forest Service 2000). The Ecogroup Forests developed a restoration prioritization process to accomplish this strategic need.

Subwatershed restoration prioritization was largely based on the social values identified with beneficial uses serving as surrogates for this indicator, specifically the following:

- *High Priority Subwatersheds* are those that contain: (1) part of stronghold for chinook salmon, sockeye salmon, steelhead trout, bull trout, or native cutthroat trout, OR (2) anadromous fish spawning or rearing habitat, OR (3) a highly isolated local population of bull trout or native cutthroat trout, OR (4) a TMDL in place.

- *Moderate Priority Subwatersheds* are those that contain: (1) any current presence of anadromous species and bull trout, including migratory habitat, OR (2) any current presence of native cutthroat trout species, OR (3) Designated Critical Habitat for Snake River sockeye and chinook salmon, OR (4) a 303(d) water quality impaired water body, OR (5) all or portions of a municipal supply watershed.

- *Low Priority Subwatersheds* are all remaining subwatersheds.

ACS Priority Subwatersheds - High priority subwatersheds were further prioritized to focus recovery efforts and provide a "blue print" as to which should be the highest priority for restoration or conservation during the planning period (next 10-15 years). ACS priority subwatersheds were identified for each subbasin to represent the "highest of the high" in terms of applying management direction and restoration prioritization, especially for short-term recovery objectives. This process is designed to focus management direction and restoration prioritization for the recovery of listed fish species, their habitats, and 303(d) impaired water bodies, and other SWRA resources. Criteria used to select ACS priority subwatersheds were as follows:

- Subwatersheds identified for a "conservation" restoration strategy automatically became ACS priority subwatersheds.
- ACS priority subwatersheds had to be hydrologically linked to either a strong or depressed population of listed species (except in the subbasins without listed fish species; then selection incorporated native cutthroat trout, wood river sculpin or redband trout).
- In subbasins where listed fish species have limited distribution or are absent entirely, emphasis was placed on identifying the subwatersheds with the best aquatic habitat adjacent to those occupied by listed or sensitive fish species.
- There was a conscious attempt to develop a network of well-dispersed ACS priority subwatersheds within the subbasin to help limit the potential impacts of stochastic events on listed fish populations.
- Where appropriate incorporate needs for listed fish species with needs for 303(d) water quality impaired water bodies or municipal supply watersheds.
- Recognition that restoration would be more effective if a full spectrum of activities were focused on a feasible amount of subwatersheds (2-5 per subbasin) within the planning period (10-15 years).

Aquatic Species Characterizations (Issues 3 and 4)

Data from the WARS database were used to identify fish presence/absence, spawning/rearing habitat, and bull trout isolated local populations at the subwatershed scale. This information was compiled for the database over the course of developing the revised Forest Plans from surveys and through discussions with biologists at the District and Forest level. Where previous BAs exist and provide information on presence, status, trends and threats regarding the listed fish, they were used to supplement the multi-scale analyses. The information in these BAs generally came from Forest surveys and inventories. In cases where information was limited, other sources, such as the FWS bull trout draft recovery plan (USDI FWS 2002) and Idaho Department of Fish and Game information, were used.

Information on the status of each population provides a basis for assessing risks from population dynamics associated with replication and synchrony. Replication refers to how many populations occur within a metapopulation. The number of populations that exist within a potential metapopulation, allows for a variety of management options to reestablish populations if one goes extinct. Widespread replication of populations reduces the possibility that a single uncharacteristic event will cause the population to go extinct, while geographically close populations allow metapopulation dynamics to function (McElhany et al. 2000).

Synchrony refers to a populations' spatial component. To best provide for the long-term survival of populations within a subbasin, environmental variation needs to be low and habitats complex. Populations that are in close proximity will likely respond to the same environmental variations (e.g., floods, droughts, etc.) and may be affected in a similar manner. When populations within a metapopulation fluctuate together, their ability to persist amid environmental change decreases. If watershed conditions provide habitat complexity that allows populations to respond differently to the same environmental change, the ability of the metapopulation to persist increases. If watershed conditions provide habitat such that populations are sufficiently distributed to require response to environmental change for only portions of the metapopulation at any given time, the ability for at least a portion of the metapopulation to persist at all times increases as well.

Aquatic Species Categorization (Issue 4)

The following is a brief discussion on how aquatic fish species were categorized within the Ecogroup area for subwatershed restoration prioritization.

Resident Fish Populations - Local resident populations of bull trout were identified and mapped using current species distribution from the most recent data (IWWI, local presence/absence surveys, etc.). Once identified and mapped, they were categorized into stronghold populations, isolated local populations, and depressed populations in marginal habitat as defined below.

Stronghold Populations – Applied to subwatersheds that support populations of fish that are considered by district biologists to be strong based on metapopulations that appear to have stable or increasing populations, all major life stages still present, and populations within a watershed, or within a larger region of which the watershed is a part, that contain at least 5,000 individuals or 500 adults. Stronghold populations probably only apply to resident fish in the Ecogroup. Anadromous subpopulations may not presently meet the definition due to depressed numbers and because not all of their life-stages occur within the Ecogroup. Data for stronghold populations are derived from IWWI and local Forest Service aquatic information; from presence/absence data; and personal knowledge of Forest Fish Biologists.

Isolated Local Populations - These have been defined as a local population (subwatershed scale) of resident fish that does not appear to be able to re-colonize the subwatershed if lost to a stochastic event. This determination is based on: (1) the local population is not hydrologically connected to other local subpopulations within the subbasin, such as where off-Forest stream dewatering has occurred; (2) linkage to other populations is now missing through habitat degradation or barriers; or (3) the only remaining local population that is connected has been rated a presence code of "4" (present, unknown status) in WARS. Isolated local populations can include both strong and depressed subpopulations. For the viability analysis, most isolated local populations were treated as depressed populations because they are at a high risk of decline from natural or management-caused activities and/or eventual inbreeding. Isolated populations were derived by overlaying current fish presence data with the most recent Watershed Advisor Group (WAG) metapopulation delineation from the State of Idaho. Where the local populations met the above definition of being highly isolated, they were so described.

Depressed Populations (Marginal Habitat) - These are areas that currently support depressed populations of resident fish or are currently vacant areas that could conceivably be re-occupied, either because they are naturally fringe habitat or because of past or current habitat degradation. Marginally occupied habitat is important for species recovery in that it can provide room for existing strongholds to expand into, and be used as a conduit between strongholds for providing genetic interchange and opportunity for recruitment if one of the strongholds loses its population

Marginal habitat subwatersheds that support populations of fish that are considered by district biologists to be depressed because the number of individuals is declining; the species occupies less than half of its historic range; a major life-history component (e.g., migratory or resident form) has been eliminated; and/or the population or metapopulation in the subwatershed, or in the larger region of which it is a part, is less than 5,000 individuals or 500 adults.

Anadromous Fish Subpopulations - Subpopulations were identified and mapped using current distribution for the species from the most recent data (IWWI, local presence/absence surveys, etc.). Once identified and mapped, subpopulations were tracked according to IWWI categories as defined below. Most of these fish species, especially the Snake River sockeye salmon, are at very low numbers within the Ecogroup and generally do not qualify as strongholds. However, IWWI data does categorize a few anadromous subwatersheds as strongholds. The IWWI categories include:

- Currently Strong
- Currently Depressed
- Currently Migration
- Currently Absent, Historically Present
- Subwatersheds rated “unknown” and “never present” were not used.

Subwatersheds rated “unknown” and “never present” were not assessed because recovery for theses species may not necessarily emphasize introducing these native fish in watersheds where they historically did not occur. Although those subwatersheds rated as “unknown” may indeed have fish present (or historically supported them), this analysis took a conservative approach and assumed they never supported them.

Descriptions of Matrix Pathways for Subbasin Characterizations (Issues 3 and 4)
Subbasin baseline conditions are described through the use of matrix pathways (see Appendix B in the revised Forest Plans, Matrix of Pathways For Watershed Condition Indicators, for more information). These pathways, and the information sources used for them, are described below. Refer to the Fish Biological Assessment and the SWRA Technical Report for more detailed information on data and analysis methods.

Population Characteristics (Issue 4) – This matrix pathway includes indicators that help describe the overall status of bull trout based on the size, life histories, connectivity, and genetic purity of populations in each subbasin. This pathway applies only to bull trout because indicators were specifically designed in the matrix to reflect key elements needed to characterize the distribution and abundance of bull trout populations as directed by the U.S. Fish and Wildlife Service.

Watershed Conditions (Issues 3 and 4) – Current conditions for soils at the subbasin scale were determined by estimating the "watershed condition" which is one of the Matrix Pathways described in Appendix B of the revised Forest Plans. To characterize overall watershed conditions, the habitat elements and watershed conditions pathways of the matrix were combined under this heading. Road densities and locations, and disturbance history as reflected by Equivalent Clearcut Area (ECA), act to influence habitat parameters such as large woody debris, pool quality and frequency, substrate conditions, riparian quality, etc. Information was available in the WARS database for road densities, and ECA values (harvest history and wildfire) were calculated for all subwatersheds within the Ecogroup Forest administrative boundaries, and were used as a basis for rating overall watershed conditions. Geomorphic integrity ratings for subwatersheds within their respective subbasin were also used in determining the overall subbasin watershed condition.

Subwatershed vulnerability is a criterion developed through the course of Forest Plan revision and provides an indication of the inherent sensitivity (soil erosion and sediment yields) of disturbance on watershed conditions and resiliency or natural ability for restoration. Subwatershed vulnerability (located in the WARS database) was assessed for each subwatershed within the Ecogroup, and was used as an indicator of overall watershed conditions.

Water Quality (Issues 3 and 4) - This matrix pathway encompasses indicators that help describe the overall water quality based on a number of parameters including temperature, sediment in spawning gravels, turbidity, and chemical contamination in each subbasin.

The WARS database was used to tally the number of subwatersheds with 303d listed, water quality limited water bodies (from the IDEQ 1998 list), and TMDLs as a surrogate for the above indicators. This is fairly straightforward and provided the most consistent assessment of water quality across the subbasins. The IDEQ documents identify known pollutants as well.

Where TMDLs are in place, the IDEQ sometimes had subbasin assessments, TMDL plans, and findings that were used to evaluate water quality and to draw conclusions for the basis of the rating. Other information sources used were Forest Service BAs, subbasin plans and watershed assessments, State of Idaho DEQ Beneficial Use Reconnaissance Project data, and local knowledge of impairments to water quality. Water quality integrity ratings for subwatersheds within their respective subbasin were also used in determining the overall subbasin Water Quality.

Habitat Access (Issue 4) - An assumption was made that an unknown number of road/stream crossings in each subbasin at least hinder or impair access because of impassable culverts, fords, collapsed bridges, etc. The WARS database was used to count the number of road crossings in each subwatershed on both perennial and intermittent streams (from a GIS exercise) associated with classified and non-classified roads. The database does not identify how many crossings are actually limiting access, but by identifying subwatersheds with high occurrences of crossings, an indication of those most likely to have fish passage problems can be estimated.

In addition to the database, existing BAs, and knowledge of other crossing or access problems (e.g., dams and diversions) were used to arrive at an evaluation of access conditions.

Channel Conditions and Dynamics (Issues 3 and 4) - This matrix pathway encompasses indicators that help describe the overall status of stream channels based on the average wetted width/depth ratios, streambank condition, and floodplain connectivity in each subbasin.

Damaged stream segments were identified as part of the multi-scale assessment that also included information from the Inland West Watershed Initiative (IWWI) assessment and these data were used as a surrogate for the above indicators to assist in evaluating channel conditions and dynamics. Damaged stream segments are those in which physical, chemical, or biological impacts have caused serious damage to water-related resource values. Seven types of impacts were chosen because they represent nearly all types of damage to water and aquatic related resource values that may occur within the Ecogroup area. The seven types of impacts are: 1) bank damage; 2) sediment loads; 3) channel modification; 4) flow Disruption; 5) thermal change; 6) chemical contamination; and 7) biological stress. Data was obtained from an extensive list of sources, some which include: first screen State-listed impaired or threatened segments from their 319(a) report, 303(d) list, or current 305(b) reports, local forest water and aquatic databases, State DEQ subbasin assessments; ICBEMP data, individual watershed analyses, site-scale NEPA projects, Idaho Department of Water Resource's River Plans, existing BAs and BO's etc. These were used as indicators of altered stream channel conditions.

Where more specific data were available they were included, though broad conclusions across the entire subbasin would not be meaningful based on width-to-depth ratios, bank stabilities, etc. because these can vary widely across the subbasin. Other sources were used (BAs, watershed assessments, etc.) to supplement this information and evaluate channel conditions and dynamics.

Flow/Hydrology (Issues 3 and 4) - This matrix pathway encompasses indicators that help describe the overall hydrology based on changes in peak/base flows and drainage networks within each subbasin.

ECA and road densities can affect flow and hydrologic characteristics and were used as a surrogate of alterations to flow and hydrologic patterns. The damaged segments listed for flow disruptions were used as well. The ECA of a subwatershed affects the streamflow regime of a subwatershed. Stream network increases, as a result of road construction, may have a large impact on the amount and timing of water reaching the stream channel.

Other known disruptions to flow from dams, diversions, and water withdrawals as documented in BAs, IDEQ documents, other Forest Service documents were used to evaluate the level of disruption of normal flow patterns and arrive at a basis for a rating.

Integration of Species and Habitat Information (Issue 4) - At the subbasin scale, general conclusions were made based on all the above information in an attempt to rate each subbasin regarding the overall condition of pathways. Although this sometimes was based on limited information, it was important to establish a general idea of baseline conditions at the subbasin scale, in order to have a benchmark for effects discussions relative to Forest Plan-related actions. An attempt was made to relate baseline conditions to known causes, and their resultant effects. Ratings are general and do not reflect local conditions in all parts of each subbasin.

Current Conditions of SWRA Resources

Soils Resource

Determining the status of soil conditions for the affected area is difficult because of the large variability of inherent conditions and the lack of Ecogroup-wide inventory and monitoring data. In general, greater declines in soil productivity are directly associated with greater loss of soil from erosion and displacement, loss of soil organic matter, changes in vegetation composition, removal or whole trees and branches, and increased bulk density from compaction. Historical factors for declining soil productivity are described above. More recently, large-scale and lethal uncharacteristic wildfires have increased the number of landscapes with declining soil productivity through reduction in effective vegetative ground cover and loss of soil-root strength, which has resulted in increased soil erosion rates. Soil productivity may be higher in areas where wildfire has been suppressed and where organic matter and vegetation have not been removed. However, the unnaturally high amounts of vegetation and large woody debris put these subwatersheds at risk for uncharacteristic wildfire intensity and severity, which can lead to decreased soil productivity because of high rates of erosion, landslides, loss of organic matter, woody debris, and nutrient reservoirs.

The current condition of soils and soil productivity was determined using both the subwatershed and subbasin scales. For example, determination of the subwatershed inherent vulnerability rating and the "geomorphic integrity rating" utilized the subwatershed scale. Ratings were calculated for all of the subwatersheds partially or wholly within the Ecogroup. Description of the overall soil resource condition is depicted using the Matrix Pathway for "watershed condition", which utilized the subbasin scale (see section below, titled "Soil Water Riparian and Aquatic Conditions for Subbasins by Matrix Pathway"). Conditions were estimated for all subwatersheds and 29 subbasins partially or wholly within the Ecogroup area.

Subwatershed Vulnerability and High and Extreme Forest Vegetation Hazard Ratings

Based on criteria described above, there are 169 highly vulnerable subwatersheds within the Ecogroup area. Of these subwatersheds, there are an estimated 82 highly vulnerable subwatersheds that have high or extreme uncharacteristic forest vegetation hazard ratings. Vegetation hazard was based on the potential vegetation group and the current stand structure, density, and composition. See the SWRA Technical Report for more information and maps describing subwatershed vulnerability, and refer to the FEIS, Chapter 3 Vegetation Hazard section for more discussion on vegetation hazard ratings.

Municipal Supply Watersheds

There are an estimated 37 subwatersheds with portions of municipal supply subwatersheds that are partially or wholly within the Ecogroup area. Table SW-2 displays the number of subwatersheds by their respective subbasin. See the SWRA Technical Report for data sources and maps used to identify municipal supply watersheds.

Table SW-2. Ecogroup Municipal Supply Watersheds and Associated Subbasins

Subbasin Name	Number of Municipal Supply Watersheds
Boise-Mores	6
Lower Boise	1
Middle Fork Payette	9
North and Middle Fork Boise	1
North Fork Payette	8
Payette	7
South Fork Payette	2
South Fork Salmon	1
Weiser River	2
Total	**37**

Subwatershed Geomorphic Integrity and Water Quality Integrity

Geomorphic Integrity and Water Quality Integrity ratings are displayed by percent of subwatersheds within Ecogroup subbasins in Table SW-3.

Table SW-3. Ecogroup Subwatershed Geomorphic and Water Quality Integrity Ratings by Percent of Subbasin

Subbasin Name	Geomorphic Integrity			Water Quality Integrity		
	L	M	H	L	M	H
Big Wood River	44	47	9	28	66	6
Boise-Mores	33	57	10	29	65	6
Brownlee Reservoir	68	32	0	14	83	3
C J Strike Reservoir	0	100	0	0	38	62
Camas Creek	0	93	7	33	67	0
Curlew Valley	13	62	25	0	75	25
Goose Creek	23	77	0	35	62	3
Hells Canyon	0	100	0	0	67	33
Lake Walcott	8	75	17	0	75	25
Little Salmon River	58	23	19	15	62	23
Little Wood River	75	25	0	50	50	0
Lower Boise	40	60	0	0	71	29
Lower Middle Fork Salmon	4	7	89	4	18	78
Lower Salmon	22	56	22	0	56	44
Middle Fork Payette	25	50	25	25	67	8
M. Salmon-Chamberlain	7	9	84	7	41	52

Subbasin Name	Geomorphic Integrity			Water Quality Integrity		
	L	M	H	L	M	H
North Fork Payette	47	41	12	19	78	3
North and M. Fork Boise	26	45	29	32	61	7
Northern Great Salt Lake	50	50	0	25	75	0
Payette	71	29	0	17	72	11
Raft River	5	95	0	4	94	3
Salmon Falls Creek	0	100	0	100	0	0
South Fork Boise River	32	66	2	18	82	0
South Fork Payette	12	35	53	6	74	20
South Fork Salmon	36	31	33	24	47	29
Upper Middle Fork Salmon	8	42	50	0	56	44
Upper Salmon	12	76	12	0	88	12
Upper Snake-Rock	0	100	0	50	50	0
Weiser River	73	27	0	30	38	32

H = High, M = Moderate, L = Low

Currently, 21 percent of all the subwatersheds have high Geomorphic Integrity (functioning appropriately, 49 percent have moderate integrity (functioning at risk), and 30 percent have low integrity (functioning at unacceptable risk). For Water Quality Integrity, 19 percent have high integrity, 63 percent have moderate integrity, and 18 percent have low integrity

303(d) Water Quality Limited Water Bodies and TMDLs
As previously identified, determination of both the water quality integrity rating and determination of the subwatershed restoration priority, including ACS priority subwatershed designation, is partially dependent on the presence of either a 303(d) water quality limited water body or TMDL. The following identifies the current condition for these indicators.

Section 303(d) of the Clean Water Act requires states to identify waters not meeting state water quality standards. This list is commonly known as the 303(d) Water Quality Limited Water Bodies. The prescribed remedy for these water bodies is for the states to determine the Total Maximum Daily Load (TMDL) for pollutants, and to develop a plan to reduce these pollutants. The TMDL process has three distinct steps: (1) subbasin assessment, (2) loading analysis, and (3) an implementation plan.

A loading analysis is needed only for those water bodies and their watersheds that were documented in the subbasin assessment to be water quality limited and only for those pollutants causing impairment. In addition to a loading capacity and allocations, a loading analysis sets out a general pollution control strategy and an expected time line for meeting water quality standards. The combination of subbasin assessment and loading analysis constitute the TMDL as required under Section 303(d) of the Clean Water Act.

Currently, there are six subbasins partially or wholly within the Ecogroup with TMDLs approved or waiting approval by the Environmental Protection Agency. They are: South Fork Salmon River, Cascade Reservoir, Middle Fork of the Payette River, Lower Boise River, Lake Walcott, and the Upper Snake-Rock subbasins. There are 75 subwatersheds partially or entirely within these subbasins with TMDLs. The main pollutant source identified is sediment, although nutrients, temperature, and other sources are also noted. Several other TMDLs are in the process of development, and additional TMDLs are expected over the coming decade.

There are currently an estimated 186 subwatersheds partially or entirely within the Ecogroup that contain 303(d) WQL Water bodies listed by the State of Idaho, Department of Environmental Quality (DEQ), as having impairment of designated beneficial uses. A variety of beneficial uses are designated for the water bodies within the Ecogroup. The dominant source of pollutant listed for these impaired water bodies is sediment, although nutrients, temperature, and other sources are also noted [State of Idaho DEQ 1998 303(d) list]. Validation of these streams as being impaired is currently being conducted by the State DEQ, and a number of streams are being considered as not warranted as a 303(d) water quality limited water body. Additional information and a map identifying subwatersheds with TMDLs and 303(d) water quality limited water bodies and their identified pollutant source(s), are in the SWRA Technical Report.

Table SW-4 identifies subbasins and their respective subwatersheds within the affected area with TMDLs or 303(d) water quality limited water bodies. Not all subwatersheds within a TMDL-assigned subbasin have a 303(d) water quality limited water body. Thus, in Table SW-4 some subbasins have more subwatersheds with TMDLs than 303(d) water quality limited water bodies.

Table SW-4. Subbasins and Subwatersheds with TMDLs and 303(d) Water Bodies

Subbasin	Number of Subwatersheds with TMDLs*	Number of Subwatersheds with 303 (d) Water Quality Limited Water Bodies*
Big Wood River	0	11
Boise-Mores	0	9
Brownlee Reservoir	0	5
C J Strike Reservoir	0	1
Camas Creek	0	2
Curlew Valley	0	0
Goose Creek	0	5
Hells Canyon	0	2
Lake Walcott	12	1
Little Salmon River	0	5
Little Wood River	0	2
Lower Boise	5	3
Lower Middle Fork Salmon	0	1
Lower Salmon	0	0
Middle Fork Payette	12	6
Middle Salmon-Chamberlain	0	22
North and Middle Fork Boise	0	3
North Fork Payette	13	9
Northern Great Salt Lake	0	0
Payette	0	0
Raft River	0	1

Subbasin	Number of Subwatersheds with TMDLs*	Number of Subwatersheds with 303 (d) Water Quality Limited Water Bodies*
Salmon Falls Creek	0	3
South Fork Boise River	0	24
South Fork Payette	0	11
South Fork Salmon	19	30
Upper Middle Fork Salmon	0	8
Upper Salmon	0	13
Upper Snake-Rock	14	3
Weiser River	0	6
Totals	**75**	**186**

*Subwatersheds included are either partially or wholly within the Ecogroup

Watershed and Aquatic Recovery Strategy

The ACS priority subwatersheds along with the subwatershed identification of restoration type and priority are spatially identified on the WARS Map (see map packet). This map includes: National Forest Administrative boundaries; subbasins, subwatersheds; and their identification as priority subwatersheds (ACS Priority Subwatersheds; Conservation, High, Moderate, and Low Priorities for Restoration); and appropriate type of restoration (Active, Passive, or Conservation). Table SW-5 identifies by Subbasin the Number of Subwatersheds by Restoration Type, Priority and ACS Priority Subwatersheds.

Table SW-5. Number of Subwatersheds by Restoration Type, Priority and ACS Priority Subwatersheds by Ecogroup Subbasin

Subbasin Name	Active High	Active Moderate	Active Low	Passive High	Passive Moderate	Passive Low	ACS Priority Subwatershed
Big Wood River	0	11	19	0	0	2	3
Boise-Mores	0	17	11	1	0	1	1
Brownlee Reservoir	3	7	18	0	0	0	2
C J Strike Reservoir	0	0	2	0	0	0	0
Camas Creek	0	2	12	0	0	0	1
Curlew Valley	0	0	5	0	0	3	0
Goose Creek	4	6	15	0	0	1	2
Hells Canyon	2	0	0	0	0	0	1
Lake Walcott	8	0	0	4	0	0	0
Little Salmon River	7	14	0	3	0	0	6
Little Wood River	0	2	6	0	0	0	2
Lower Boise	5	0	0	0	0	0	0
Lower M. Fork Salmon	2	0	0	25	0	0	4
Lower Salmon	4	2	0	3	0	0	3
Middle Fork Payette	10	0	0	2	0	0	3
Middle Salmon-Chamberlain	14	3	0	23	5	0	4
North and M. Fork Boise	2	21	1	4	2	0	4
North Fork Payette	12	11	7	2	0	0	1

Subbasin Name	Active High	Active Moderate	Active Low	Passive High	Passive Moderate	Passive Low	ACS Priority Subwatershed
Northern Great Salt Lake	0	0	8	0	0	0	0
Payette	1	9	6	0	0	1	2
Raft River	5	8	29	0	1	0	1
Salmon Falls Creek	0	3	4	0	0	0	0
South Fork Boise River	4	44	11	0	1	0	12
South Fork Payette	4	16	2	2	9	0	5
South Fork Salmon	46	3	0	20	1	0	8
Upper M. Fork Salmon	6	0	0	5	0	0	4
Upper Salmon	32	10	0	6	0	0	18
Upper Snake-Rock	14	0	0	0	0	0	2
Weiser River	2	12	28	1	0	6	3
Totals	**187**	**201**	**184**	**101**	**21**	**14**	**92**

Aquatic Species

Threatened or Endangered Species - Special management emphasis is given to species for which there is a documented viability concern. Species listed under the ESA fall into four categories based on viability concerns: Threatened, Endangered, Proposed, and Candidate. The Forest Service has a legal requirement to maintain or improve habitat conditions for threatened, endangered, and proposed species under the ESA. Administrative direction also exists to maintain or improve conditions for species on the Regional Forester's sensitive species list, and for Management Indicator Species, which are addressed in Forest Service Manual 2670, and Handbook 2609.

Columbia River bull trout were listed as threatened by the FWS on June 10, 1998 (63 FR 31647). The bull trout occurring in the Ecogroup area are part of the Columbia River distinct population segment and are in the Salmon River (entire Salmon River Basin), Southwest Idaho (Boise, Payette and Weiser River Subbasins), Imnaha-Snake River (includes Deep Creek on the Payette NF), and Hells Canyon (includes a small portion on the far western side of the Payette NF) draft FWS recovery plan units. Resident and migratory forms of bull trout occur in streams on all three Ecogroup Forests. In the fall of 2002, the U.S. Fish and Wildlife Service (USFWS) proposed to designate critical habitat for the Klamath River and Columbia River DPS' of bull trout pursuant to the ESA [Federal Register, November 29, 2002 (67 FR 71236)]. Proposed critical habitat includes bull trout habitat across the species' range in Idaho, Montana, Oregon, and Washington. Twenty-five Critical Habitat Sub Units (CHSU) have been delineated.

Snake River sockeye salmon were listed as endangered by NMFS on November 20, 1991 (56 FR 58619). Snake River spring/summer and fall chinook salmon were listed as threatened by the NMFS on April 22, 1992 (57 FR 14653). Snake River steelhead were listed as threatened by the NMFS on August 18, 1997 (62 FR 43937). The NMFS designated critical habitat for Snake River spring/summer and fall chinook salmon and Snake River sockeye salmon on December 28, 1993 (58 FR 68543). Essential Fish Habitat (EFH) has been designated for chinook salmon habitat (67 FR 2343). In the Ecogroup area, EFH overlaps with, and is identical to, designated critical habitat for fall and spring/summer chinook salmon. The effects analysis for critical habitat addresses any potential effects to Essential Fish Habitat.

The salmon and steelhead addressed in this assessment are part of the Snake River Basin Evolutionarily Significant Units (ESUs) for each species. These ESUs are distinctive groups of salmon or steelhead and include multiple spawning populations, some of which occur on the three Forests. The Snake River Basin ESUs for each species contain considerable diversity in their genetic and life history traits, and in habitat features, and extend across a geographic area considerably larger than the Ecogroup. Maintaining the genetic, life history, and habitat feature diversity found within an ESU is critical to maintaining the overall health of the ESU populations. The Federal Register designation of critical habitat specifically defines geographic areas and essential habitat elements.

Biological Opinions have been developed for threatened and endangered species by both regulatory agencies. Biological Opinions have been issued by both regulatory agencies for effects of management actions that include the existing Forest Plans on threatened and endangered fish species. In the absence of recovery plans, these Biological Opinions provide interim goals and actions to recover species. Threatened, endangered, proposed, or candidate species that occur within the Ecogroup area, their locations, and important consideration for management are described in Table SW-6.

Table SW-6. Locations and Factors of Decline for Threatened, Endangered, Proposed, or Candidate Species in the Ecogroup

Common Name	Forest - Subbasins*	Global Rank^	Listing Under ESA	Factors of Decline+ within Some Level of Forest Service Influence
Sockeye salmon	Sawtooth – Upper Salmon subbasin	G5T1	E	Destruction, modification, and fragmentation of habitat and inadequate regulatory mechanism
Spring/summer chinook salmon	All 3 - All subbasins in the Salmon River Basin & Hells Canyon subbasin	G5T1	T	Same as above
Fall chinook salmon	Payette – Lower Salmon and Hells Canyon subbasins	G5T1	T	Same as above
Snake River steelhead	All 3 - All subbasins in the Salmon River Basin & Hells Canyon subbasin	G5T1	T	Same as above
Columbia River bull trout	All 3 - All subbasins in the Salmon River Basin, Boise River Basin, Payette River Basin, and Weiser, Brownlee Reservoir, & Hells Canyon subbasin	G3T2	T	Destruction, modification, and fragmentation of habitat, introduced species, and inadequate regulatory mechanism

* Forests and subbasins in the Ecogroup where this species occurs.
^ Global Rank is a system of ranking the range-wide status of species maintained by State Conservation Data Centers and Natural Heritage Programs throughout North America and several other countries. Numerical rankings range from G1 to G5, where G1 species are considered critically imperiled at the global scale, and G5 species are considered globally widespread, abundant, and secure, although there may be concerns for the viability of local populations. Rankings from T1 to T5 indicate the status of subspecies, varieties, and populations, with T1 species being the most imperiled. Information at the subspecies level is not available for all species. Many researchers believe that species ranked G1-G3 need special consideration or mitigation for management activities that may negatively affect their habitat because their long-term viability is currently a concern (Andelman et al. 2001).
+Factors of decline have been listed for each species under Section 4(a)(1) of the ESA.

Snake River Sockeye Salmon (Oncorhynchus nerka) - Escapement of sockeye salmon to the Snake River has declined dramatically in the last several decades. Adult counts at Ice Harbor Dam declined from 3,170 in 1965 to zero in 1990 (ODFW and WDFW 1998). At Redfish Lake Creek, adult counts dropped from 4,361 in 1955 to fewer than 500 after 1957 (Bjornn et al. 1968). A total of 16 wild sockeye salmon returned to Redfish Lake between 1991 and 2000.

Historically, Snake River sockeye salmon were produced in the Salmon River subbasin in Alturas, Pettit, Redfish, and Stanley Lakes, and in the South Fork Salmon River subbasin in Warm Lake. Sockeye salmon may have been present in one or two other Stanley Basin lakes (Bjornn et al. 1968). Elsewhere in the Snake River Basin, sockeye salmon were produced in Big Payette Lake on the North Fork Payette River (Evermann 1896, Toner 1960, Bjornn et al. 1968, Fulton 1970). Access to the Payette Basin was eliminated in 1923 with the construction of Black Canyon Dam near Emmett, ID. Within the Ecogroup, sockeye salmon migrate through the main Salmon River, and spawn and rear only in Redfish Lake in the Sawtooth NRA on the Sawtooth National Forest. These are the only remaining sockeye salmon in the Snake River Basin.

An intensive recovery program is underway in an attempt to restore sockeye salmon in the upper Salmon River drainage. Although not specifically designated in the 1991 listing, Snake River sockeye salmon produced in the captive broodstock program are included in the listed ESU. Given the dire status of the wild population (16 wild and 264 hatchery-produced adult sockeye returned to the Stanley Basin between 1990 and 2000), NMFS considers the captive broodstock and its progeny essential for recovery. Under their interim policy on artificial propagation (58 FR 17573), the progeny of fish from a listed population that are propagated artificially are considered part of the listed species and are protected under the ESA.

Snake River Spring/Summer Chinook Salmon (Oncorhynchus tshawytscha) - Hydropower development in the Columbia River Basin has resulted in migration blockage and inundation of habitat, predator populations have increased due to hydroelectric development that has created ideal foraging areas, and water withdrawal and storage, irrigation diversions, grazing, logging, mining and other activities have modified and destroyed habitat and curtailed the range of these species. Ocean and river harvest, and inadequate regulatory mechanisms are other factors affecting chinook salmon abundance.

In the Ecogroup area, spawning and rearing spring/summer chinook salmon occur in a wide range of streams across the Salmon River Basin. Bevan et al. (1994) estimated the number of wild adult Snake River spring/summer chinook salmon in the late 1800s to be more than 1.5 million fish annually. By the 1950s, the population had declined to an estimated 125,000 adults. Escapement estimates indicate that the population continued to decline through the 1970s. Estimated annual numbers of adult, natural-origin Snake River spring/summer chinook salmon returning to Lower Granite Dam since 1979 varied through the 1980s, but there have been further declines in recent years. Record low returns occurred in 1994 (1,721 fish) and 1995 (1,116 fish). Dam counts were modestly higher from 1996 through 1998, reaching about 8,400 fish in 1998, but declined in 1999 to 3,276 fish.

Snake River Fall Chinook Salmon (Oncorhynchus tshawytscha) - Construction of dams on the Snake River inundated fall chinook spawning habitat and prevented upstream passage to primary production areas for this species in the upper Snake River because fish passage facilities at the dams proved to be inadequate. The distribution of Snake River fall chinook has been dramatically reduced and now represents only a fraction of its former range. Natural fall chinook salmon spawning now occurs primarily in the Snake River below Hells Canyon Dam and in the lower reaches of the main Salmon River.

The distribution of fall chinook in the Ecogroup area is limited. Fall chinook salmon are late spawners (October - November) that generally use large mainstem rivers and tributaries. There is evidence they historically existed in the lower South Fork Salmon River on the Payette National Forest, but they have not been sighted there for twenty years (Burns 1992). Fall chinook salmon do not occur on the Boise or Sawtooth National Forests.

Snake River Steelhead (Oncorhynchus mykiss) - In the Ecogroup area, the range of spawning and rearing steelhead encompasses streams across the Salmon River Basin. Snake River steelhead spawning areas are well isolated from other steelhead populations and include the highest elevations for spawning (up to 2000m) as well as the longest migration distance from the ocean (up to 1500km). Snake River steelhead are summer steelhead, meaning they enter fresh water in a sexually immature condition and require several months to mature and spawn. They are often further classified into A-run and B-run groups based on migration timing, ocean age, and adult size. A-run steelhead are believed to occur throughout the Snake River Basin. B-run fish are thought to be produced only in the Middle Fork Salmon and South Fork Salmon River subbasins in the Ecogroup area. These two subbasins have wild steelhead that are unaffected by hatchery production and are considered strongholds for genetically unique, B-run steelhead populations (Quigley and Arbelbide 1997).

Counts of fish passage at Lower Granite Dam and redd counts conducted annually in Idaho document declines in steelhead numbers. In general, Snake River steelhead abundance declined sharply in the early 1970s, rebuilt modestly from the mid-1970s through the 1980s, and declined again during the 1990s. Total (hatchery + natural) run size for Snake River steelhead has increased since the 1970s, but the increase has resulted from increased production of hatchery fish and there has been a severe recent decline in natural run size. Downward trends and low parr densities indicate a particularly severe problem for B-run steelhead, the loss of which would substantially reduce life history diversity within the ESU.

Forestry, agriculture, mining, and urbanization are listed as factors that have degraded, simplified and fragmented habitat. Water diversions for agriculture, flood control, domestic and hydropower purposes are noted as having greatly reduced or eliminated historically accessible habitat. Loss of habitat complexity has also contributed to the decline of steelhead. Sedimentation from land use activities was specifically mentioned as a primary cause of habitat degradation in the range of this species.

Columbia River Bull Trout (Salvelinus confluentus) - The Columbia River bull trout DPS is represented by relatively widespread subpopulations that have declined in overall range and numbers of fish. Bull trout presently occur in about 45 percent of their historic range in the interior Columbia Basin. Numerous extirpations of local populations have been reported throughout the Columbia River Basin. The Snake River basin is considered a bull trout stronghold by the USFWS, as it is a large area of contiguous habitats.

In the Ecogroup area, resident and migratory forms of bull trout occur on streams across the Salmon River, Boise River and Payette River Basins, and Weiser, Brownlee Reservoir, and Hells Canyon subbasins. Bull trout habitat generally extends beyond other listed fishes. Bull trout have more specific habitat requirements compared to other salmonids (Rieman and McIntyre 1993). Water temperature, cover, channel form and stability, valley form, substrates and migration corridors act to influence bull trout distribution and abundance. Bull trout exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993).

The decline of Columbia River bull trout is primarily due to habitat degradation and fragmentation, blockage of migration corridors, poor water quality, past fishery management practices and the introduction of non-native species (63 FR 31647). Grazing, road construction and maintenance, past over-harvest, inadequacy of existing regulatory mechanisms, and isolation and habitat fragmentation have played a part in the decline of bull trout and their habitat. Widespread introductions of non-native fishes have caused local bull trout declines and extirpations. Negative effects from interactions with introduced non-native species may be the most widespread threat to bull trout in the Columbia River Basin.

In the Ecogroup area, bull trout passage and migration are prevented or inhibited by hydroelectric, flood-control, or irrigation dams. For example, historically, bull trout in the Boise River likely functioned as a single subpopulation, with migratory adults moving among areas that are now isolated because of the construction of Arrowrock and Anderson Ranch Dams. The long-lasting negative effects from past timber management activities and roads are a continuing threat to bull trout because of their impacts on habitat conditions. Although harvest practices have been altered recently to improve protection of aquatic resources, the consequences of past activities continue to affect bull trout and their habitat.

Sensitive Species - At present, two aquatic species within the Ecogroup are on the Forest Service, Intermountain Region sensitive species list. The list is evaluated annually to see if species need to be added or removed. This list has not changed since 1995, and it was used in this analysis because it has strongly influenced past and recent management action conducted under the current Forest Plans.

Species are designated as "sensitive" by the Regional Forester because their population or habitats are trending downward, or because little information is available on their population or habitat trends. The primary purpose of the sensitive species program is to conserve or restore habitat conditions for species that are assumed to be at risk and to prevent them from becoming federally listed under the ESA. Regional and Forest Plan direction is designed to restore, protect, and enhance sensitive species habitat and population viability. The sensitive species, their locations, and important consideration for management are described in Table SW-7.

Table SW-7. Locations and Management Considerations for Sensitive Species and Species of Special Concern in the Ecogroup

Common Name	Forests - Subbasins*	Global Rank	Forest Service Sensitive Species	Management Considerations within Some Level of Forest Service Influence
Westslope cutthroat trout	All 3 – All subbasins in the Salmon River Basin & Hells Canyon subbasin	G4T3	Y	Destruction, modification, and fragmentation of habitat, introduced species, and inadequate regulatory mechanism
Wood River sculpin	Sawtooth – Big Wood, Little Wood and Camas Creek subbasins	G2	Y	Destruction, modification, and fragmentation of habitat and inadequate regulatory mechanism
Yellowstone cutthroat	Sawtooth – Goose Creek, Raft River, and Upper Snake-Rock subbasins	G4T2	N	Destruction, modification, and fragmentation of habitat, introduced species, and inadequate regulatory mechanism

* Forests and subbasins in the Ecogroup where this species occurs.

Westslope Cutthroat Trout (*O. clarki lewsi*) - In the Ecogroup, the range of spawning and rearing westslope cutthroat trout encompasses streams across the Salmon River Basin and portions of the Hells Canyon subbasin. Most strong populations are associated with roadless and wilderness areas. Quigley and Arbelbide (1997) state that remaining populations may be seriously compromised by habitat loss and genetic introgression through hybridization. Local extirpations are evident in some areas. Construction of dams, irrigation diversions, or other migration barriers have isolated or eliminated westslope cutthroat trout habitats that were once available to migratory populations in some areas (Rieman and Apperson 1989). Other factors attributed to the decline of cutthroat include introduction of non-native fish, angler harvest, and habitat degradation from water diversions, grazing, mineral extraction, timber harvesting, and road construction.

Locations of remaining pure-strain populations of westslope cutthroat trout have not been identified within the Ecogroup area. It is assumed that many genetically pure populations occur; however, stocking of high mountain lakes and many stream systems with rainbow and Yellowstone cutthroat have undoubtedly introgressed the native westslope cutthroat populations to varying degrees in many areas. The current state fish management plan (IDFG 2001) notes that sterile fish will be stocked to eliminate potential interbreeding with native fish. A high proportion of high lakes have received sterile trout in the past year.

Westslope cutthroat trout are currently listed as federal and state (Idaho) species of concern and sensitive species by the USFS. This species was petitioned for listing under the Endangered Species Act in 1997, with no finding from the U.S. Fish and Wildlife Service, and again in 1998, with a warranted and initiation of a status review. On April 5, 2000, the United States Fish and Wildlife Service announced their 12-month finding, concluding that after review of all scientific and commercial information, the listing of the westslope cutthroat trout was not warranted. As a result of a U.S. District Court ruling on September 3, 2002, the U.S. Fish and Wildlife Service initiated a new status review for westslope cutthroat, which has not yet concluded.

Wood River Sculpin (Cottus leiopomus) - The Wood River sculpin, a small narrowly endemic fish, is known to only occur in the Big and Little Wood River, and Camas Creek subbasins within the Ketchum and Fairfield Ranger Districts of the Sawtooth National Forest. Although its distribution is not extensive, this sculpin appears to be doing well in many of the streams where it occurs, although Simpson and Wallace (1982) feel its existence could be threatened by additional habitat degradation.

The Wood River sculpin was first collected from the Little Wood River near Shoshone, Idaho in 1893 (Gilbert and Evermann 1895). Historically, the range of Wood River Sculpin consisted of all permanent, interconnected waters from the falls on the Malad River upstream into the Little Wood and Big Wood Rivers and their tributaries (Simpson and Wallace 1982). It is likely that the Wood River sculpin was the only sculpin present in the drainage. The Wood River sculpin was more widely distributed in the drainage historically than at present. However, no basin-wide inventories have been conducted to accurately determine its present range.

Wood River sculpin are found in clear, highly oxygenated stream systems with clean rock or gravel substrates. They require cool temperatures and are intolerant of water pollution; thus, their presence in a stream usually indicates high water quality. Bottom dwellers, they often hide under rocks and debris when not active.

Past and present activities on Forest Service administered lands--such as livestock grazing, mining, road building, and timber harvesting--have adversely affected the sculpin wherever sedimentation and water temperatures have been measurably increased above their natural ranges. Off-Forest impacts include sedimentation and dewatering, with irrigation diversions often isolating subpopulations to headwater streams, such as in the East Willow Creek drainage of the Fairfield Ranger District.

Management Indicator Species (MIS) - Management Indictor Species (MIS) can be selected for several reasons, one of which is, "…because their populations are believed to indicate the effects of management activities" (36 CFR 219.19(a)(1). By monitoring and assessing habitat conditions of MIS, managers can estimate effects on other species within similar habitats. However, monitoring of current MIS has indicated that some may not be good indicators for Forest habitat conditions and management activities. Some MIS were selected because they were thought to be good biological indicators, but monitoring has shown this not to be the case (see Preliminary AMS and Forest Five-year Monitoring Reports). Also, some of the MIS migrate off Forest and may be influenced by non-federal activities. For migratory species, a change in population may not represent changes in local Forest habitat conditions. Additional analysis and rationale for changing MIS is contained in the Aquatic MIS process paper in Appendix F to the FEIS.

Columbia River Bull Trout - A description of this species and its habitat needs and trends is in the Threatened and Endangered Species section, above. This species is identified as an MIS for the Boise, Payette, and Sawtooth National Forests because of extensive past habitat reduction, and the potential for additional habitat modification in the future.

Species of Special Interest – The following species is addressed in this analysis due to concerns about the low number of pure-strain populations in the Ecogroup area and the known threats to their limited habitat.

Yellowstone Cutthroat Trout (*Oncorhynchus clarki bouvieri*) - This subspecies is the only native trout above Shoshone Falls on the Snake River (Quigley and Arbelbide 1997). It was historically limited to this drainage above the falls (Behnke 1992). Raft River and Goose Creek on the south end of the Sawtooth National Forest, along with their tributaries, historically supported this subspecies (Behnke 1979). Yellowstone cutthroat are now limited to only a few perennial stream systems of the south end of the Sawtooth National Forest, with Eightmile Creek on the Black Pine Division supporting the only laboratory-confirmed pure-strain population remaining (Behnke 1984). According to local IDFG biologists, slightly introgressed populations (an estimated 90-99% pure) are found in most subwatersheds. Many decades of Yellowstone cutthroat stocking, however, have extended some populations out of their historical range. Introduced Yellowstone cutthroat are now well distributed in the central Idaho mountains within the Ecogroup area.

Decline of this subspecies is attributed to introduction of non-native fish, angler harvest, and habitat degradation from water diversions, grazing, mineral extraction, timber harvesting, and road construction. Cutthroats do not compete well with exotic trout, especially where their habitat has been disturbed or if angler pressure is extreme (Quigley and Arbelbide 1997). This is especially true where brook trout introductions have occurred.

Subbasin Baselines - Matrix Pathways for Ecogroup

The Matrix in Appendix B of the revised Forest Plans was used as a template for displaying existing environmental conditions relative to specific pathways. The pathways represent ways by which actions can potentially affect TEPC fish species and SWRA resources. Matrix pathways were previously developed as a tool in making effects calls by the NMFS (1996). Their intent is to provide a simple, yet holistic suite of pathways (and indicators) to characterize environmental baseline conditions. This approach was used to provide a level of uniformity and standardization in the subbasin baseline descriptions.

Fourth-field hydrologic units as delineated by USGS were used to define each subbasin; then baseline conditions were assessed for each subbasin and their respective subwatersheds (6^{th} field HUs) in the action area. There are differences in the amount of information presented for those subbasins within the Ecogroup and those partially or wholly outside the Ecogroup because of a lack of readily available information for portions of the subbasins outside the Ecogroup.

The current environmental conditions in the affected area are not solely due to actions authorized or administered by the Ecogroup Forests. In some cases, land and water uses managed by other entities, and other factors exclusive of the Forests, including natural disturbances, have had a greater effect on pathway conditions at the subbasin scale. This influence can correspond to the type of ownership (state, private, etc.). In addition, factors outside the affected area--such as

Snake River and Columbia River hydropower projects, ocean and river harvest, hatchery influences, and downstream habitat conditions--play a role in determining the status of migratory fish populations that spawn and rear in streams within the Ecogroup area. These factors are recognized as contributing to the decline in numbers of the listed fish.

Subbasin baseline descriptions are organized under their respective River Basins to assist in evaluating current conditions for an entire river basin. Because of the large number of subbasins in the action area, a template was developed that incorporated appropriate baseline information common to all, and available for all, subbasins. The template was also an attempt to impose some consistency in the baseline descriptions. Subbasin baseline conditions are described through the matrix pathways (refer to current condition methodology section). A summary for the baseline conditions for each subbasin is presented below.

Table SW-8. Summary of Baseline Conditions for Subbasins within the Affected Area

River Basin and Subbasin (4th level HUC and Name)	Pathways						
	Population charac-teristics[1]	Water-shed condi-tions	Water quality	Habitat access	Channel conditions and dynamics	Flow/ hydrology	Integration of species and habitat conditions
Boise River – 17050111, North & Middle Fork Boise	FR	FR	FR	FUR	FR	FR	FR
Boise River – 17050112, Boise-Mores	FUR	FR	FR	FUR	FR	FR	FR
Boise River – 17050113, South Fork Boise River	FR	FR	FR	FUR	FR	FR	FR
Boise River – 17050114, Lower Boise	FUR	FR	FR	FUR	FR	FR	FR
Payette River – 17050115, Middle Snake-Payette	FUR	FR	FUR	FUR	FUR	FUR	FUR
Payette River – 17050120, South Fork Payette	FR	FR	FR	FUR	FR	FR	FR
Payette River – 17050121, Middle Fork Payette	FUR	FR	FUR	FUR	FR	FR	FUR
Payette River – 17050122, Payette River	FUR	FR	FR	FUR	FR	FR	FUR
Payette River – 17050123, North Fork Payette	FUR	FR	FUR	FUR	FR	FR	FUR
Weiser River – 17050124, Weiser River	FR	FR	FR	FR	FR	FR	FR
Upper Middle Snake – 17050201, Brownlee Rsvr.	FUR	FR	FR	FR	FR	FA	FR
Hells Canyon, Snake – 17060101, Hells Canyon	UNK	FA	FR	FR	FA	FA	FR
Lower Middle Snake – 17050101, CJ Strike	--	FR	FR	FA	FR	FR	FR
Salmon River – 17060201, Upper Salmon	FUR	FR	FR	FUR	FR	FR	FR
Salmon River – 17060202, Pahsimeroi	FR	FR	FR	FUR	FR	FUR	FR

River Basin and Subbasin (4th level HUC and Name)	Pathways						
	Population charac-teristics[1]	Water-shed condi-tions	Water quality	Habitat access	Channel conditions and dynamics	Flow/ hydrology	Integration of species and habitat conditions
Salmon River – 17060203, Middle Salmon-Panther	FR	FR	FR	FR	FR	FR	FR
Salmon River – 17060204, Lemhi	FUR	FR	FR	FR	FR	FUR	FUR
Salmon River – 17060205, Upper Middle Fork Salmon[2]	FR	FR	FR	FA	FR	FR	FR
Salmon River – 17060206, Lower Middle Fork Salmon[2]	FR	FR	FA	FA	FR	FR	FR
Salmon River – 17060207, Middle Salmon-Chamberlain[2]	FR	FR	FR	FA	FR	FR	FR
Salmon River – 17060208, South Fork Salmon	FR	FR	FR	FR	FR	FR	FR
Salmon River – 17060209, Lower Salmon	FR	FR	FR	FA	FR	FR	FR
Salmon River – 17060210, Little Salmon River	FR	FR	FUR	FR	FR	FR	FR
Upper Snake – 17040219, Big Wood River	--	FA	FR	FR	FR	FUR	FR
Upper Snake – 17040221, Little Wood River	--	FR	FR	FR	FR	FR	FR
Upper Snake – 17040220, Camas Creek	--	FR	FR	FR	FR	FR	FR
Upper Snake – 17040211, Goose Creek	--	FR	FR	FUR	FR	FUR	FUR
Upper Snake – 17040212, Upper Snake-Rock	--	FR	FUR	FUR	FR	FUR	FUR
Upper Snake – 17040210, Raft River	--	FUR	FR	FUR	FR	FUR	FUR
Upper Snake – 17040213, Salmon Falls	--	FUR	FUR	FUR	FUR	FUR	FUR
Upper Snake – 17040209, Lake Walcott	--	FR	FR	FR	FR	FR	FR
Great Salt Lake – 16020309, Curlew Valley	--	FR	FUR	FUR	FUR	FUR	FUR
Great Salt Lake – 16020308, Northern Great Salt Lake	--	FUR	FR	FR	FR	FUR	FR

[1] For bull trout only.
[2] Ratings are for non-wilderness portions of these subbasins only. The wilderness portions are all considered to be functioning appropriately.
FR = functioning at risk
FA = functioning appropriately
FUR = functioning at an unacceptable risk

When taken together, the pathway ratings for the subbasins generally reflect the environmental conditions of the affected area as a whole, though they do not reflect actual conditions in each stream in the affected area. Few subbasins were found to have any pathways functioning appropriately across an entire 4^{th} field HU, outside of the wilderness. While human impacts occur in the wilderness and can influence the function of pathways in site-specific instances, they were not considered to have a broad enough influence to alter a pathway at the subbasin scale.

Soils Resource - Subbasin Matrix Pathways
Watershed Condition - Most subbasins are functioning at risk for watershed condition (see Table SW-8). Two subbasins (Hells Canyon and Big Wood River) are functioning appropriately and three subbasins (Raft River, Salmon Falls and Curlew Valley) are functioning at an unacceptable level of risk. Watershed conditions in the Raft River, Salmon Falls and Curlew Valley are largely influenced by actions on non-federal land. Livestock grazing, irrigation dams and ditch networks, dispersed recreation, wood gathering, road construction and maintenance, and timber harvest have influenced conditions. These actions have resulted in degraded soil-hydrologic process, reduced protective ground cover, accelerated surface erosion and sediment delivery to streams, altered riparian vegetation, loss potential wood sources, and altered stream channels and flows.

Water and Riparian Resource - Subbasin Matrix Pathways
Water Quality - Water quality degradation generally relates to land disturbances and associated increased erosion and sedimentation. Water quality is functioning at risk in most subbasins. Most subbasins are functioning at risk for watershed condition (see Table SW-8). One subbasin (Lower Middle Fork Salmon) is functioning appropriately and seven subbasins (Salmon Falls, Curlew Valley, Middle-Snake Payette, Middle Fork Payette, North Fork Payette, and Little Salmon) are functioning at an unacceptable level of risk. All of the subbasins identified as functioning at an unacceptable risk (with the exception of the Middle Fork of the Payette River) are largely influenced by actions on non-federal land. Road construction and location, livestock grazing, mining, irrigation dams and ditch networks, dispersed recreation, and timber harvest have influenced water quality conditions. These actions have resulted in degraded water quality negatively affecting beneficial uses and aquatic habitat.

All but three subbasins contain 303(d) water quality limited water bodies. Six subbasins contain subwatersheds associated with TMDLs. Sediment is the main pollutant source contributing to degraded water quality; however, elevated temperatures play a role as well. Heavy metals, nutrient loading, and chemical contamination contribute to degraded water quality in some subbasins.

Channel Conditions and Dynamics **-** This pathway is functioning at risk in all subbasins, with the exception of the Middle-Snake Payette, Curlew Valley, Salmon Falls, and Upper Snake-Rock, where it is functioning at an unacceptable level of risk, and the Hells Canyon subbasin, where it is functioning appropriately. All subbasins have damaged stream segments and all have roads within RCAs. Both of these factors contribute to degraded channel conditions and dynamics in Ecogroup area streams. Hells Canyon is the exception. Some subbasins have high width/depth ratios and bank stabilities less than 80 percent, contributing to risks in the function of the pathway. Human activities, primarily timber harvest, road construction, and grazing, have reduced linkages between flood plains, wetlands, and main channels in Ecogroup subbasins.

Flow/Hydrology **-** The greatest effect to this pathway is the presence of water diversions, impoundments, and channel dewatering. These factors affect this pathway on private land more than on Ecogroup lands, and they seem to influence flows more than ECA and roads, although many subbasins include ECA and road densities/locations as rationale for an “at risk” rating.

Extensive irrigation in some subbasins (e.g., North Fork Payette) is dewatering channels, but this is outside of the Forests' influence. In some subbasins (e.g., the South Fork Salmon River, Lower Middle Fork Salmon River, Big Wood, Upper Snake-Rock, Goose Creek, Curlew valley, Great Northern Salt Lake Desert, and Raft River), there are known flow alterations from water withdrawals that do not generate an effect at the subbasin scale but locally affect flow patterns.

Aquatic Species - Subbasin Matrix Pathways

Population Characteristics (Bull Trout Only) - Dams such as the Hells Canyon Complex, Diversion Dam, Lucky Peak, Arrowrock, Anderson Ranch, Deadwood, and Black Canyon have removed the migratory component of bull trout populations, eliminated connectivity, and fragmented habitat (and eliminated anadromous fish presence) in all but the Salmon River system and a small segment in the Snake River below Hells Canyon, resulting in isolated remaining populations. Smaller dams, diversions and water withdrawals on private land also fragment habitat and decrease connectivity for remaining fish.

In the Salmon Basin, habitat degradation contributes to population characteristics functioning at risk. In this basin, migratory forms are present and connectivity generally exists. However, migration and connectivity impairments--again related to irrigation, dams, and diversions on private land--occur in parts of the Salmon Basin.

Brook trout, and in some cases other non-native fishes, hinder recovery of bull trout populations and put the species at risk in nearly all the subbasins. Generally the assumption was made that if brook trout were present they were a risk to bull trout even if no documentation existed as to displacement or hybridization with bull trout.

Watershed Conditions **-** This pathway includes a number of factors. Most watershed conditions are functioning at risk in all subbasins. Two subbasins (Hells Canyon and Big Wood River) are functioning appropriately and two subbasins (Raft River and Curlew Valley) are functioning at an unacceptable level of risk. Watershed conditions in the Raft River and Curlew Valley are largely influenced by actions on non-federal land. Livestock grazing, irrigation dams and ditch networks, dispersed recreation, wood gathering, road construction and maintenance, and timber harvest have influenced conditions. These actions have resulted in sediment delivery to streams, altered riparian vegetation, loss potential wood sources, altered stream channels and flows, and elimination of connectivity and access.

Continued effects from past land use activities--such as mining, grazing, road construction and locations, and timber harvest--degrade overall watershed conditions. Road densities and road locations often contribute to degraded watershed conditions in Ecogroup subbasins, because of their effect on LWD, riparian conditions, and sediment delivery. Generally, cumulative impacts for past and (less often) present factors are contributing to degraded watershed conditions and a functioning at risk condition. Overall watershed conditions are a result of mostly past activities that have degraded overall conditions, primarily in riparian areas.

Water Quality - Water quality degradation generally relates to land disturbances and associated increased erosion. Mining, and agricultural uses that occur primarily off-Forest degrade water quality as well. Water quality is functioning at risk in most subbasins. The water quality in the Middle Fork and North Fork Payette, Middle-Snake Payette, Curlew Valley, Upper Snake-Rock subbasins, and the Little Salmon River is functioning at an unacceptable level of risk. One subbasin, the Lower Middle Fork Salmon, has water quality functioning appropriately. All but one or two subbasins contain stream segments listed as impaired in IDEQs 1998 303d list. Seven subbasins contain waters associated with TMDLs. Sediment is contributing to degraded water quality; however, elevated temperatures play a role as well. Heavy metals, nutrient loading, and chemical contamination contribute to degraded water quality in some subbasins.

Habitat Access - Habitat access is the pathway found to most often be functioning at an unacceptable level of risk. Interestingly, it was also the pathway with the most functioning appropriately ratings. Aside from the obvious large dams (mentioned above under population characteristics), there are numerous physical passage impairments and barriers to fish movement in Ecogroup subbasins. In the Boise and Payette Basins, where migration has been eliminated by large dams downstream, the connectivity and access situation is further exacerbated by small dams and impoundments, diversions, numerous road stream crossings, and dewatering of channels in the basins. With the exceptions of road stream crossings, most of these facilities are on private land. Dams that are not under the authority of the Forest Service largely influence the overall condition.

Channel Condition and Dynamics - This pathway is functioning at risk in all subbasins, with the exception of the Middle-Snake Payette, Curlew Valley, and Upper Snake-Rock subbasins, where it is functioning at an unacceptable level of risk, and the Hells Canyon subbasin, where it is functioning appropriately. All subbasins have damaged stream segments (identified through IWWI) and all have roads within RCAs. Both of these factors contribute to degraded channel conditions and dynamics in Ecogroup area streams. Hells Canyon is the exception. Some subbasins have high width/depth ratios and bank stabilities less than 80 percent, contributing to risks in the function of the pathway. Human activities, primarily timber harvest, road construction, and grazing, have reduced linkages between flood plains, wetlands, and main channels in Ecogroup subbasins.

Flow/Hydrology - The greatest effect to this pathway is the presence of water diversions, impoundments, and channel dewatering. These factors affect this pathway on private land more than on Ecogroup lands. These factors seem to influence flows more than ECA and roads, although many subbasins include ECA and road densities and locations as rationale for an “at risk” rating. Extensive irrigation in some subbasins (e.g., the Pahsimeroi) is known to dewater channels but this is outside of the Forests’ influence. In some subbasins, there are known, local flow alterations from water withdrawals that do not generate an effect at the entire subbasin scale but locally affect flow patterns (e.g., the South Fork Salmon River, Lower Middle Fork Salmon River, Big Wood, Upper Snake-Rock, Goose Creek, Curlew valley, Great Northern Salt Lake Desert, and Raft River).

<u>*Integration of Species and Habitat Conditions*</u> - This composite pathway is found to be functioning at an unacceptable level of risk in subbasins within the Payette River Basin, and Lemhi, Upper Snake-Rock, Goose Creek, Curlew Valley and Raft River subbasins, and is functioning at risk in all other subbasins. Ratings generally repeated the findings for the preceding pathways of effects, with similar rationale. The overall depressed status of listed fish populations contributes to the functioning of this pathway. A cumulative degradation of individual habitat pathways, leading to an overall decrease in the suitability of the habitat to support listed fish species, causes this pathway to be functioning at risk as well.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

<u>Resource Protection Methods</u>

Resource protection has been integrated into soil, water, riparian, and aquatic management direction at various scales, from broad scale (laws, regulations, policies) to Forest-wide (Forest Plan direction) to site-specific (Forest Plan implementation). This protection and direction has been designed to maintain or improve these resources and associated beneficial uses, depending on their current conditions. Land management activities on federally managed lands are conducted only after appropriate site-specific NEPA analysis has been completed. Such analysis is required to describe the direct, indirect and cumulative impacts of the site-specific alternatives on adjacent lands and resources, including watersheds. Subsequent NEPA analysis will provide opportunities to detect and minimize direct, indirect, and cumulative environmental effects that cannot be specifically determined at the large scale of this EIS.

Laws, Regulations, and Policies - Numerous laws, regulations, and policies govern the use and administration of soil, water, riparian, and aquatic (SWRA) resources on National Forest administered lands. Congress has passed legislation to protect and manage these resources, and these laws influence the Forest Service's authority and compliance for management of resources on National Forest System lands. Some key legislation—such as the Clean Water Act, Executive Orders 11988 and 11990, and the Endangered Species Act—is briefly described in Appendix H to the revised Forest Plans.

These laws are interpreted into National and Regional regulations and policies to help federal agencies follow the intent of the laws. Regulations and policies developed from the laws that most influence the management of Forest wildlife resources are 36 CFR 219.19 Planning regulations, 1500 NEPA regulations, and the 2500, 2600, and 3500 sections of Forest Service Manual and Handbook direction. Agency direction, in turn, influences finer-scale analysis, biological assessments, inventories, and monitoring. The intent of these fine-scale activities is to make better management decisions based on local information to maintain or improve watershed conditions and habitats for species with identified concerns. All land management activities occurring on National Forest System lands must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation and management of SWRA resources.

Forest Plan Direction – Management direction generally takes three forms in the Forest Plans: (1) Forest-wide direction that applies to the entire Forest, (2) Management Area direction that applies to specific Management Areas, and (3) MPC assignment that provides prescriptive emphasis and direction for each area where a particular MPC is applied across the Forest. Together, these components provide a layered set of direction and emphasis for resource management.

Forest Plan direction is different for the no action alternative (1B) than it is for the action alternatives (2-7). The no action alternative would continue management strategies under the original Forest Plans (USDA Forest Service 1987, 1988, 1990), as amended to include prescriptive standards and conservation measures in Pacfish, Infish, and Biological Opinions for listed fish species. These prescriptive standards and conservation measures provide a very high level of temporary and short-term SWRA resource protection aimed at halting further degradation from specific management activities, but they have been inconsistently implemented as in some cases they lack clear direction and definitions of key terms. Furthermore, as identified in the 1995 and 1998 BOs, they generally lack direction for long-term resource restoration or recovery. The reason for this is that the measures were specifically designed as short-term interim protection until long-term strategies could be put in place, either through Forest Plan revision or similar planning methods. The measures were applied to the original Plans without any attempt at integration with the existing Plan direction. Thus, the Forests have subsequently found that original plan direction is often contradicted by these conservation measures.

For example, although the original plans have long-term goals and objectives for SWRA resources, these goals and objectives have not always been aggressively pursued or achieved because of the strict short-term protection measures. Indeed, the Forests have found the implementation of any ground-disturbing project or activity, including SWRA restoration, to be at times problematic under these conservation measures because the measures have been written and interpreted in such a way that they often do not allow for measurable temporary or short-term impacts in order to achieve long-term management goals and objectives.

Forest plan direction for the action alternatives, found in Chapter III of the revised Forest Plans, was developed to address the shortcomings in the current direction while providing a very high level of SWRA resource protection. The action alternatives have been designed to allow for some temporary or short-term impacts in order to achieve long-term resource restoration or maintenance goals and objectives. Examples of this are found in SWRA Standards 1 and 4:

> 1) Management actions shall be designed in a manner that maintains or restores water quality to fully support beneficial uses and native and desired non-native fish species and their habitat, except as allowed under SWRA Standard 4 below. Use the MATRIX located in Appendix B to assist in determining compliance with this standard.
>
> 4) Management actions will neither degrade nor retard attainment of properly functioning soil, water, riparian, and aquatic desired conditions, except:
>
> - Where outweighed by demonstrable short- or long-term benefits to watershed resource conditions; or

- Where the Forest Service has limited authority (e.g., access roads, hydropower, etc.). In these cases, the Forest Service shall work with permittee(s) to minimize the degradation of watershed resource conditions.

Use the MATRIX located in Appendix B to assist in determining compliance with this standard.

These standards protect SWRA resources by restricting actions that would degrade properly functioning conditions, while allowing actions to occur that would benefit but not degrade SWRA resource conditions over the long term. This management strategy has been integrated throughout revised management direction at the Forest-wide, MPC, and Management Area levels. Management prescriptions and other resource areas have similar direction to help avoid, minimize, or mitigate potential management activity impacts to SWRA resources. A TEPC Species section has also been added to the Forest-wide direction to provide special emphasis and protection for aquatic and terrestrial species of concern across all resource areas.

Another significant Forest Plan difference between the no action and the action alternatives is found in the management emphasis associated with MPCs. Special management prescriptions have been developed for the revised plans to emphasize management for passive (MPC 3.1) and active (MPC 3.2) restoration and maintenance of aquatic, terrestrial, and hydrologic resources. These MPCs have associated standards and guidelines that are designed to provide additional protection for these resources. In particular, the first standard for each MPC states:

MPC 3.1
Standard - Management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary time period (up to 3 years), and must be designed to avoid resource degradation in the short term (3-15 years) and long term (greater than 15 years). Degrade and degradation are defined in the glossary.

MPC 3.2
Standard - Management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary (up to 3 years) or short-term time periods, and must be designed to avoid resource degradation in the long term (greater than 15 years).

Different combinations and amounts of these two MPCs were applied to the action alternatives to indicate shifts in management emphasis related to aquatic, terrestrial, and hydrologic resources. However, these MPCs and their associated emphasis and direction are not found in, and do not apply to, the no action alternative (1B).

Besides more comprehensive and integrated direction and emphasis for SWRA resources, the revised Plans—and therefore the action alternatives—provide a blueprint for long-term restoration, recovery, and maintenance of soil, water, riparian, and aquatic resource conditions. This blue print is called the Aquatic Conservation Strategy (ACS) and it is described in the ACS section, below.

Forest Plan Implementation - Appropriate management and restoration of SWRA resources generally depends on current and site-specific information about existing biophysical conditions, historical conditions, desired conditions, and social needs. These factors are not easily addressed at the programmatic level, or may be similar to all alternatives. Land management activities with the potential for disturbing or restoring these resources will be assessed through a combination of mid-scale watershed-based analyses, development of water quality restoration plans, biological evaluations and assessments, inventory and monitoring, and site-specific NEPA analysis. Through this process, which is the same for all alternatives, management decisions for SWRA resources would be made to address concerns in a timely, effective, and site-specific manner that involves the Forest Service, other agencies, governments, tribes, permittees, contractors, and the public in land management actions.

Aquatic Conservation Strategy (ACS) - The ACS has eight components that provide direction to maintain and restore characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. How the ACS components are applied at the subwatershed and site-specific levels will affect the types and outcomes of management actions and will therefore be an overriding factor that influences potential effects for SWRA resources.

Because the ACS was developed for the revised Forest Plans, it applies to the action alternatives (2-7) but not to Alternative 1B, no action. However, there are elements of the ACS (management direction, monitoring plans, multi-scale analysis, RHCA delineation) that also occur in the original Forest Plans as amended, and therefore Alternative 1B. This section briefly describes the eight components of the ACS and how they help provide for recovery and restoration of SWRA resources. This section will also briefly describe those ACS components that exist under the interim Pacfish and Infish strategies and listed fish species Biological Opinions for Alternative 1B. For more detailed descriptions of the ACS components, see Section III.E in the Biological Assessment for the Southwest Idaho Ecogroup Forest Plan Revision (2003). A more detailed discussion of the ACS under Alternative 1B can be found in the SWRA technical report.

The ACS is a long-term strategy to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within lands administered by the Ecogroup Forests. Embedded within the ACS, Forest Plan direction provides policy guidance and requirements. The eight ACS components are identified below.

Component 1: Goals to Maintain and Restore SWRA Resources – Numerous Forest-wide and Management Area SWRA resource goals and objectives have been created that spatially and temporally identify restoration prioritization based on the long- and short-term recovery needs of listed fish species and the de-listing of water quality impaired water bodies. These goals have been developed to achieve the desired conditions described in the TEPC Species, SWRA Resources, and Desired Conditions Common to All Resources sections in Chapter III of the Forest Plans. SWRA resource goals have been coordinated and integrated with the goals of other resource areas to establish a vision of management direction that reduces threats and promotes healthy, functioning ecosystems, watersheds, riparian areas, and fish habitats.

Resource goals of the Pacfish and Infish strategies are similar to the SWRA and TEPC goals under the action alternatives. These goals give general direction to maintain and restore characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. However, goals under Alternative 1B have not been integrated with other resources and have not created a common vision to reduce threats and promote healthy, functioning ecosystems.

Component 2: Watershed Condition Indicators (WCIs) for SWRA Resources - WCIs, detailed in Appendix B of the Forest Plans, identify various biological and physical components of aquatic systems and terrestrial uplands that influence riparian functions and ecological processes. The WCIs are organized into eight Pathways that represent conditions or processes related to SWRA resources. Together, they provide a process to identify how management actions may influence the condition and trend of SWRA resources, and a decision framework to help ensure that management actions will not retard or prevent attainment of properly functioning SWRA conditions. The WCIs can also be used as a tool in making ESA determinations of effects to listed fish species, and as a benchmark by which changes to SWRA conditions from management activities can be measured over time.

Interim Riparian Management Objectives (RMOs) were included in Pacfish and Infish to halt degradation of aquatic resources. These indicators were intended to serve as default "target" values that, when achieved, would provide a high level of habitat diversity and complexity to meet the needs of the fish community inhabiting a watershed. Effective indicators of stream habitat condition would provide criteria against which progress toward attainment of riparian goals could be measured.

Component 3: Delineation of Riparian Conservation Areas (RCAs) - RCAs contribute to the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter and woody debris to streams; (2) providing root strength for channel stability; (3) shading the stream; and (4) protecting water quality. Because riparian areas are so important for protecting the integrity of aquatic ecosystems, an entire suite of RCA-related management direction has been developed for the revised Forest Plans. Delineation of these key areas is described in Appendix B to the Forest Plans, "Guidance for Delineation and Management of Riparian Conservation Areas." This delineation will help ensure that site-specific riparian function and ecological processes are maintained or restored.

Under Infish and Pacfish, protection and management of RHCAs is a principal means by which the riparian goals and RMOs may be attained. As with the RMOs, default widths of RHCAs identified in the strategies can be modified using watershed or site-specific analysis. However, these strategies provide little guidance on the level of documentation and rationale required to redefine RHCA boundary widths or justify activities within RHCA boundaries.

Component 4: Objectives, Standards, and Guidelines for Management of SWRA Resources, including RCAs - The objectives, standards, and guidelines to maintain and restore SWRA resources provide protection necessary to conserve listed fish species and water quality, and direction to maintain or restore priority subwatersheds. Together, this direction provides the operating sideboards for management activities designed to achieve SWRA and other resource goals described in the Forest Plan (see ACS Component 1). SWRA objectives, standards, and guidelines were coordinated and integrated with direction for other resource areas to ensure compatibility and consistency in implementation.

Objectives, standards, and guidelines under Infish and Pacfish provide a similar level of protection as management direction under the action alternatives. However, these interim strategies provide virtually no allowance for short-term impacts. The RHCA can be so restrictive that it is very difficult to implement long-term restoration activities without violating some protection standards.

Component 5: Determination of Priority Subwatersheds within Subbasins – ACS priority subwatersheds have been identified that provide a pattern of protection and restoration across the Forest for the recovery of threatened and endangered fish species, the full support of beneficial uses and subsequent de-listing of 303(d) water quality impaired water bodies, and the restoration and maintenance of SWRA resources. The process used to identify ACS priority subwatersheds for the ACS is described in Section III (E)(6) of the BA for the SWIE Forest Plan Revision. ACS priority subwatersheds have the highest priority for restoration, monitoring, and future multi-scale assessments. In addition, each ACS priority subwatershed is identified in its respective management area, and management area direction provides specific restoration objectives and management consideration during the planning and implementation of management actions.

Infish and Pacfish interim strategies designate key and priority watersheds. However, the current list of designated key and priority watersheds does not include nor prioritize all high quality areas that are needed to adequately conserve and recover bull trout. The key and priority watershed network identified in Pacfish and Infish is based on direction to complete watershed analysis for project-related work. The interim strategies also lack a step-down process to identify priority subwatersheds, the type of restoration needed, and subwatershed restoration prioritization.

Component 6: Multi-Scale Analyses of Subbasins and Subwatersheds - The Forests completed multi-scale Properly Functioning Condition (PFC) assessments that provide a multi-scale connectivity between each subbasin and its subwatersheds, and identify current and potential population status, upland and aquatic conditions and restoration needs, and management risks and opportunities to meet broad-scale and mid-scale goals through site-specific management actions. Assessments show how each subwatershed contributes to recovery of a listed species or impaired water bodies within a subbasin. As such, they provide interim recovery strategies until formal listed fish species recover or TMDL plans are issued. The results of the multi-scale assessment have been incorporated into the revised Forest Plans in the form of Forest-wide objectives, standards and guides, and management area objectives for restoration and recovery.

To effectively prioritize key watersheds and prioritize/coordinate restoration activities within those watersheds across the range listed fish species, NFMS and FWS identified the need for subbasin assessments and watershed analysis. To address this need, the NMFS and FWS 1998 BOs for steelhead and bull trout called for completion of at least one subbasin assessment and watershed analysis per National Forest per year. The purpose of the subbasin assessment was to identify where to prioritize subsequent watersheds for watershed analysis in support of implementing watershed restoration projects. The Ecogroup determined that in order to develop a watershed and recovery strategy for the forest plan revision, a more timely and comprehensive multi-scale assessment was needed. This multi-scale assessment was completed and the results incorporated into the forest planning process as identified above.

<u>Component 7: Determination of the Appropriate Type of Subwatershed Restoration and Prioritization</u> – This component identifies active, passive, and conservation restoration strategies based on subwatershed geomorphic integrity, water quality integrity, aquatic integrity, and vulnerability ratings. Together, these ratings provide the information needed to identify the current condition of a subwatershed and the capacity of a subwatershed to restore itself naturally to a desired condition. The ratings also indicate the acceptable or needed time period for restoration in order to determine the type of approach (restoration or conservation) to be used. Recovery and restoration activities are prioritized based on the presence and sensitivity of listed fish species, impaired water bodies, municipal supply watersheds, and the resiliency of ecosystem processes within the subwatershed. This process consistently applies appropriate restoration prioritization to all subwatersheds across the Ecogroup area.

Neither Pacfish nor Infish include a restoration plan or a process to develop a restoration plan, given the expected short time period for implementation of these interim strategies. Both strategies assume no additional funding would be available for watershed restoration, but that some existing funds may be targeted to initiate a watershed restoration program. No specific guidance, however, is given on how to prioritize restoration efforts. Both strategies assume that watershed analysis would be used to establish restoration priorities for each watershed, and that key and priority watersheds would have the highest priority for restoration efforts.

<u>Component 8: Monitoring and Adaptive Management Provisions</u> – The monitoring plans and adaptive management found in the revised Forest Plans provide a feedback loop that gives managers the information necessary to make appropriate adjustments to Forest activities and programs. If monitoring finds that restoration or mitigation is ineffective, or desired conditions are not being maintained, changes to management practices can be implemented to correct the situation. Adaptive management provides the mechanism to modify management actions in response to monitoring and evaluation, changes in laws or regulations, or new information—including the ability to make appropriate modifications to restoration direction, mitigation measures, budgets, and monitoring approaches. See Chapter IV in the revised Forest Plans for more detailed information.

Pacfish and Infish were interim strategies and thus did not place a high emphasis on monitoring. Monitoring to assess if protective measures were effective to attain RMOs was a lower priority due to the short time frame of the interim direction. However, the NMFS and USFWS BOs led to the development of a coordinated monitoring effort (Integrated Implementation Monitoring Module, or IIT) over the Pacfish and Infish areas. This monitoring effort provides similar feedback loops as the action alternatives, which incorporate the IIT monitoring strategy that can be used to modify management activities.

<u>Summary</u> - The eight components of the ACS are designed to work in concert to maintain and restore the productivity and resilience of watersheds and their associated aquatic ecosystems. The ACS provides a scientific basis for protecting aquatic ecosystems; promoting a comprehensive short and long-term recovery of listed fish species; restoring aquatic habitats and surrounding terrestrial uplands; restoring beneficial uses leading to the de-listing of 303(d) water quality impaired water bodies; and planning for sustainable resource management. In essence, this strategy integrates many of the goals and objectives of both the Endangered Species Act and the Clean Water Act.

<u>General Effects</u>

Although the Resource Protection Methods above would greatly reduce or minimize any potential effects from Forest Service management activities that may occur in the next planning period, this analysis assumes that some level of effects would still occur when and if these activities or uses occur. Put another way, certain activities or uses produce certain effects to SWRA resources. For example, ATVs crossing through streams have effects on the streams. The Forest Service can mitigate those effects to acceptable levels by designating ATV trails, prohibiting use in sensitive areas, providing bridges at certain crossings, relocating trails, and other methods, but the agency cannot guarantee that no ATV will ever cross a stream, especially when ATV use is allowed on the Forests. As long as the use is occurring, it will have some level of impacts to water quality and fish habitat, regardless of the resource protection methods applied. The ESA, CWA, and other SWRA resource-related protection methods (see above) recognize that some level of unavoidable impacts will occur on federal lands, and they provide measures for addressing those impacts.

General types of expected or unavoidable impacts are described by resource area, below. The following also identifies the issues to which these effects apply and when the potential level of these effects may vary by alternative, which are analyzed in the section on Direct and Indirect Effects by Alternative. The effects descriptions focus on management activities or uses as they relate to SWRA resources.

Natural events are not addressed here, except where events are directly influenced by management activities, such as uncharacteristic wildfire. Natural disturbance events—such as wildfire, landslides, windstorms, floods, and drought—may result in temporary, short, or long-term effects on SWRA resources. However, these sorts of effects from natural events also create the diversity and dynamics for healthy and fully functioning habitats. When resources and ecosystems are resilient and within HRV, they can absorb these effects and recover in shorter periods of time. However, when SWRA resources have been chronically disturbed by ongoing management activities, effects can be substantially greater and last longer

A more detailed discussion of how specific Forest-wide and MPC management direction addresses general effects can be found in Chapter VI of the Biological Assessment (BA, Chapter VI, Fisheries, *Effects Analysis*).

Rangeland Resources - Livestock grazing, particularly over-grazing, can lead to a reduction of soil structure, soil compaction, less soil-water storage, accelerated soil erosion, and damage or loss of vegetative cover. Roberson, 1996, identifies that excessive surface soil erosion has profound effects on soil productivity and riparian function and processes. This can lead to changes in the composition of riparian species from plants with deep soil-holding roots to less desirable, shallow-rooted species. Loss of streamside vegetation can increase stream temperature, and decrease sediment filtration capability. Soil compaction, changes to riparian vegetation, and channel widening or down cutting can cause changes to water infiltration, retention, and base flows. These conditions can cause less water to be available to instream habitat during low flow conditions.

Increased sedimentation from grazing, particularly streambank trampling, can lead to increased bank erosion and channel widening. Grazing can also compact spawning substrates, collapse undercut banks, destabilized stream banks, and cause localized reduction or removal of herbaceous and woody vegetation along stream banks and within riparian areas (Platts 1991). If delivered in sufficient quantities, grazing-related sedimentation can fill interstitial spaces in stream bed material, impeding water flow through redds, reducing dissolved oxygen levels, and restricting removal of wastes from redds. These conditions may lead to increased embryo and fry mortality (Bjornn and Reiser 1991). Sedimentation, especially in low-gradient channels, can also lead to the filling of rearing habitat (e.g., pool, glides, etc.).

All the Resource Protection Methods would mitigate these types of general effects under all alternatives. However, it is assumed that temporary impacts (disturbance or trampling of redds, localized bank erosion, channel widening, and pool filling) would still occur where grazing use and activities are allowed due to the continued presence of cattle or sheep.

Potential Effects from MPCs and Uses – Impacts from grazing may vary by alternative, depending on the amount of suitable rangeland acres and the grazing management strategies used on those acres, as reflected by MPC assignments. These indicators are used to display effects by alternative for Issues 3 and 4 in the Direct and Indirect Effects section below.

Recreation Resources - General effects from recreational use, construction, and maintenance to SWRA resources can include undesirable changes to: (1) upland and riparian soil and vegetation conditions, causing increased erosion and runoff, decreased soil-hydrologic function, loss of vegetative cover and wood recruitment, and reduced water quality; (2) stream morphology, water quality, streamflow, and substrate; and (3) water quality from spills of fuel, oil, cleaning materials or human waste associated with equipment, and the pumping of toilets. Other specific effects are described below.

Non-motorized and motorized watercraft use can “disturb” or “stress” adult and juvenile fish. Typical activities associated with non-motorized use include floating, wading, and swimming in areas where fish are holding, rearing, or spawning. Studies conducted on the Rogue River have shown that juvenile salmon and steelhead passed by non-motorized watercraft exhibited both behavioral and physiological signs of stress (Satterthwaite 1995). The energy expended by juvenile salmonids reacting to passing watercraft may result in a reduction in energy available for growth and development. A decrease in available energy stores may also reduce their effectiveness in competing for food, defending territories, or spawning.

Streambank trampling, camping along the stream’s edge, heavy fishing, and off-road vehicle use usually result in the loss of vegetation within riparian areas. Loss of vegetation from shorelines, wetlands, or steep slopes can cause erosion and pollution problems (Burden and Randerson 1972, Gilliom et al. 1980, Quigley and Arbelbide 1997).

Trail maintenance can affect large wood recruitment and function that influences stream channel morphology and aquatic habitat. Bucking out fallen trees can reduce the tree's length and sever the bole from its root wad. Smaller tree lengths are not likely to contribute as much to stream channel stability and are more likely to be washed out during high stream flow events. Smaller instream wood will also delay the recovery of channel features needed to maintain habitat for aquatic species, including overhead cover and low-velocity refugia during high-flow events.

All the Resource Protection Methods would mitigate these types of general effects under all alternatives. However, it is assumed that temporary and short-term impacts to fish, riparian vegetation, woody debris, and water quality would still occur where recreation use and activities are allowed. Existing recreational facilities and actions within or affecting RCAs may need to be modified, discontinued, or relocated if they are not maintaining fully functional aquatic/riparian conditions and processes, or improving conditions and processes. Modification or relocating facilities may cause temporary affects to the above-mentioned indicators. Where facilities cannot be located outside of RCAs, effects would be minimized to the greatest extent possible, but not completely eliminated.

Potential Effects from MPCs and Uses – This level of use is generally not expected to vary much by alternative, as described in the Recreation Resources section of Chapter 3. The exception to this is motorized recreation use, which would be prohibited in recommended wilderness areas under Alternatives 4 and 6. This indicator is used to display effects by alternative for Issue 4 in the Direct and Indirect Effects section below.

While impacts do not vary by alternative significantly, they do vary between subbasins. Subbasins with more recreational sites, trails, and roads in RCAs have a greater potential for impacts to SWRA resources. Subbasins with the highest recreational activities in RCAs are displayed in the table below. Effects in high activity subbasins have the potential to be in conflict more with SWRA resources. Furthermore, where there is greater use, there is a greater potential for temporary and short-term effects from disturbance to fish/redds, stream bank trampling, wood, sediment, and loss of riparian vegetation.

Table SW-9. Existing Recreational Use in Each Subbasin by Level of Activity

High Activity Subbasins	Moderate Activity Subbasins	Low Activity Subbasins
Big Wood River	Brownlee Reservoir	CJ Strike Reservoir
Boise-Mores	Lake Walcott	Camas Creek
Middle Fork Payette	Little Salmon River	Curlew Valley
Upper Snake-Rock	Little Wood River	Goose Creek
North and Middle Fork Boise	Lower Middle Fork Salmon	Hells Canyon
North Fork Payette	Lower Salmon	Lower Boise
South Fork Boise	Middle Salmon-Chamberlain	Northern Great Salt Lake
South Fork Payette	Payette	Salmon Falls Creek
South Fork Salmon	Raft River	Upper Middle Fork Salmon
Upper Salmon	Weiser River	

Lands and Special Uses - It is difficult to assess the effects that may occur within this category because of the large variety of projects that may be permitted under the lands program. Therefore, this effects discussion only touches upon some permitted activities. Forest Service permits can also lead to interrelated and interdependent effects on private lands that are enabled by issuing a road use permit or right-of-way grant. However, a discussion of these effects is beyond the scope of this document.

Special-use permits can allow for hatchery facilities or fish stocking by State fish and game agencies. Stocking can have many biological effects, including increased competition to aquatic organisms and hybridization with native fish. High fish densities from stocking can attract heavier fishing pressure, which can lead to over-harvest of wild fish (Quigley and Arbelbide 1997).

Accelerated soil erosion, loss of long-term soil productivity, stream sediment, and turbidity can increase due to increased road activity from issuance of road use permits or granting of right-of-ways. Road-related effects are discussed under “Timberland/Vegetation Resources” below.

Permitted water diversions can entrain fish if they are not properly screened, and fish can be impinged against screens. Water diversion can weaken juvenile fish as they try to escape higher velocities and redirected flows. This can also lead to mortality of fish as they are exposed to higher water temperatures or dewatering in irrigation ditches. Water diversions can also inhibit the passage of adult and juvenile fish by redirecting flows, dewatering streams, or entrainment.

Water withdrawals can affect summer stream temperatures by ponding water, reducing water depth and volume, and transferring water to an open ditch. Water withdrawals can also increase sediment delivery to streams by changing stream hydrology, causing bank erosion and structural failures of ditches or pipes, which can result in gullying or erosion.

Permitted power and telephone lines require vegetation to be cleared, usually 10 to 50 feet either side of the lines. Clearing brush and trees in riparian reserves may increase solar radiation to streams and the forest floor. The precise effects to water temperature will depend on how close to the stream trees are treated, how many trees are treated at a given site, and how much vegetation is currently available to shade the stream at the site and at upstream reaches. The limbing, topping, or removal of hazard trees near utility lines can also reduce in-channel wood.

All the Resource Protection Methods would mitigate these types of general effects under all alternatives. However, it is assumed that temporary and short-term impacts would still occur where special uses are allowed or mandated. Actions may also occur where the risk of short-term effects is worth taking because there would be significant benefits to watershed resource conditions over the long term. Existing facilities and actions within or affecting RCAs may need to be modified, discontinued, or relocated if they are not maintaining or improving fully functional aquatic/riparian conditions and processes. Modification or relocation of facilities may cause temporary affects. Where facilities cannot be located outside of RCAs, effects would be minimized to the greatest extent possible, but not completely eliminated.

There would also be other circumstances where the Forest Service has limited authority under the Federal Power Act for hydroelectric facilities and ANILCA access authorizations. Effects from these actions would likely to continue due to limited discretion to fully mitigate effects.

Potential Effects from MPCs and Uses – The type of activity associated with special uses is typically of a low and dispersed nature, and it is not expected to vary by alternative. Predicting where future permits may be issued is also problematic because permits are dependent on requests made by Forest users. Therefore, this analysis will not further address effects from lands and special uses.

Soil, Water, Riparian, and Aquatic Restoration - A wide variety of restoration projects can be covered in this category. Given the wide array of channel types and baselines that a project designer may face, the scenarios for potential effects are numerous. Therefore, this effects discussion only touches upon some of the potential effects.

Properly designed and maintained road treatments can decrease sediment loading to streams and over time improve habitat conditions. However, before such improvements can be realized, temporary, short-term, and long-term changes in soil productivity, sediment and turbidity increases can occur from project implementation, as well as from post-project stabilization. Turbidity and sediment increases could result from the construction of restoration access roads, channel excavation, some types of structure placement, culvert replacement, and hauling materials to sites over native surface roads.

Road treatments can upgrade or remove problem culverts, which can provide substantial benefits to aquatic systems by allowing sediment and wood to move downstream, and by providing greater connectivity for native aquatic species. However, correcting culvert barriers can also allow introduced species greater access to tributary habitat. These species can increase competition, hybridization, and the displacement of native salmonids. Projects with these potential effects should be analyzed carefully.

Removal or closure of valley bottom roads can have a short and long-term positive effect on soil-hydrologic function, soil productivity, and stream water temperature. Trees and other riparian vegetation can re-colonize a ripped roadbed and help provide shade. How much temperature improves depends on the existing stream shade and water temperature, the stream's size, and how much riparian road is removed or closed.

Aggrading substrate behind placed stream-structures can reduce the low-flow wetted channel width and the width-to-depth ratio, increase sinuosity and meander pattern, and over time restore floodplain connectivity. Structures can stabilize stream channels over the long term and make them more resistant to erosion by dissipating stream energy during periods of high runoff. Gravel bars typically re-vegetate with riparian species such as alder, willow, or maple, ultimately leading to channel narrowing and stabilization. Restoration of floodplain connectivity over time will result in more frequent inundation of the floodplain, fostering the creation of side channels, seasonally flooded potholes, and other kinds of off-channel habitats.

Placement of large wood can improve sediment routing while creating more physically complex fish habitat. The stability or longevity of this wood within streams is strongly linked to its size, orientation to flow, channel dimensions, watershed area above the structure, and the percentage of the log that is in the active channel. Eventually some movement downstream will take place. Pieces that move can become incorporated in larger wood complexes or hang up on streamside trees or other channel features.

SWRA restoration effects can be of a positive or negative nature. All the Resource Protection Methods would mitigate the general negative effects described above under all alternatives. However, it is assumed that temporary and short-term impacts to fish, stream channels, water quality, etc. from culvert removals, in-channel restoration, and habitat surveys will still occur. It is also assumed that long-term positive effects would occur from these restoration activities.

<u>*Potential Effects from MPCs and Uses*</u> – Both positive and negative effects may vary by alternative, depending on their restoration emphasis as reflected by MPC assignments. This indicator is used to display effects by alternative for Issues 3 and 4 in the Direct and Indirect Effects section below.

Timberland/Vegetation Resources (Including Road and Fire Use Related Activities) - Timber harvest and road-related activities (felling, yarding, skidding, landing construction, road construction/reconstruction) can reduce soil productivity by removing snags, downed logs and coarse woody debris, accelerating soil erosion, and increasing the frequency and distribution of landslides. Organic matter, both above and below the ground, is an important component for maintaining soil productivity. Organic matter is important for soil water retention, nutrient exchange and cycling, and erosion control (Graham et al. 1994 and Page-Dumroese et al. 1991). Loss of soil productivity may result from removal of snags, downed logs and coarse woody debris material. Accelerated surface erosion, landslide potential, and increased levels of sedimentation decrease over time from initial disturbance, but often remain above natural levels for many years. Negative effects can increase when activities occur on inherently sensitive terrain with steep slopes composed of highly erodible soils that are subject to climatic stresses. Vulnerable watersheds generally have steeper slope gradients, high inherent soil erodibility, and high potential for landslide activity. Soil and site disturbance that occur from timber harvest and road-related activities are often responsible for increased rates of erosion and sedimentation, and modification and disruption of water quality, and riparian and aquatic habitats. Physical changes can affect runoff events, bank stability, sediment supply, large woody debris retention, and stream temperature. Increased sediment delivery, especially fine sediments, can be associated with timber harvest. As deposition of fine sediment in salmonid spawning habitat increases, mortality of embryos, alevins, and fry rises.

Timber harvest has the potential to affect stream temperatures primarily through reducing streamside canopy levels. The potential for riparian vegetation to mediate stream temperatures is greatest for small to intermediate size streams and diminishes as streams increase in size (Spence et al. 1996). Harvest actions can also influence stream temperature by changing the volume and timing of peak flows, elevating suspended sediment levels, and altering channel characteristics (Chamberlain et al. 1991, Spence et al. 1996).

Timber harvest has the potential to affect habitat by reducing large woody debris recruitment, altering pool quality, and reducing pool frequency and depth. Riparian area timber harvest has a direct effect to the amount of large woody debris that is recruited into the stream, which is important to cover, shade, and in-channel sediment storage.

Timber harvest affects watershed conditions as measured through the indicators of disturbance history and regimes. Disturbance regime conversion through past vegetation management practices or fire exclusion has altered tree stand density, composition, and age.

Hydrologic and sediment regimes can be altered by vegetation removal, site disturbance, and soil compaction associated with timber harvest. Harvest and site preparation that disturbs soils—such as tractor skidding, cable yarding, prescribed fire, and scarification—can alter the ability of soils to accept water, increasing the potential for overland flow, and altering normal pathways for water entry to streams (Chamberlain et al. 1991). Canopy removal also alters the amount, frequency, and intensity of precipitation delivery to forest floors (Stednick 1996, Megahan et al. 1995 and Troendle and Olsen 1993). These disturbances may also lead to increased amounts of water yield and sediment introduced into streams and altered sediment routing.

All the Resource Protection Methods would mitigate these types of general effects under all alternatives. However, it is assumed that temporary and short-term impacts to soil productivity, water quality, watershed conditions, and flow/hydrology would still occur where timber harvest, road-related activities, and fire use take place. Actions may also occur where the risk of short-term effects is worth taking because there would be significant benefits to watershed resource conditions over the long term. For example, relocating a road located within an RCA, which is causing accelerated sediment to spawning areas downstream, may cause degrading effects over the temporary and short term, but would provide significant benefits to watershed resource conditions over the long term. Impacts resulting from the construction, reconstruction, maintenance, and decommissioning of roads, even the most cautious construction methods, would also likely to yield some degree of impact.

Potential Effects from MPCs and Uses – The level of impact may vary by alternative, depending on the amount of suited timberland acres and Equivalent Replacement Treatment (ERT) acres there are, as reflected by MPC assignments. These indicators are used to display effects by alternative for Issues 3 and 4 in the Direct and Indirect Effects section below.

Fire Management - Fire contributes to a host of functions and processes in ecosystems. Fire reduces accumulations of organic material, which in turn reduces wildfire hazard (Harrington 1996). Fire recycles nutrients and alters soil chemistry, aids in decomposition, and influences soil structure and stability (Covington et al. 1997, Arno et al. 1995, and Kaufmann 1990). Fire effects can vary depending on fire intensity, severity, and frequency, the primary factors that define fire regimes. Wildfires are defined as an “unwanted wildland fire” that can affect water chemistry, water quantity, and stream channel structure through changes in transpiration, infiltration, ground water recharge, erosion and mass wasting, riparian shading, and the recruitment and delivery of coarse debris (Meyer et al. 2001, Moody and Martin 2001a and 2001b, Moody 2001, Wondzell 2001, Gresswell 1999 and Benda and Dunne 1997). Potential post-wildfire risks from floods, landslides, and debris flows to human life, property, and/or municipal supply watersheds are an increasing concern (Moody and Martin 2001b).

Wildfires can have important direct and immediate effects on native fishes or their habitats, but the ultimate effects on aquatic organisms and fishes may be apparent only some time after the wildfire has occurred (Reeves et al. 1995). Effects will depend on a variety of conditions, including: 1) the nature of the fire (patchiness, intensity) and subsequent precipitation; 2) the prior conditions of the watershed and riparian communities; 3) the potential for demographic support or recolonization of fish communities as influenced by proximity and location of refugia; 4) the expression of complex life history patterns and overlapping generations (Warren and Liss 1980, Rieman and Clayton 1997), and 5) the nature of fire suppression and post-fire management (Gresswell 1999, McIver and Starr 2000).

Temporary, short term, and long term effects of fire usually result from erosion associated with climatic events that trigger surface erosion or an increase in subsurface mass failures (landslides), which in turn can alter stream channel structure and function. The intensity and scale of these effects are related to the current vegetation hazard condition, size and intensity of the wildfire, vulnerability, size of watershed, and climatic triggering event. Riparian vegetation is consumed and shade is reduced, but increased streamflow heating may be offset by increases in cooler water from subsurface flow and reduction of evapotranspiration.

Wildfire suppression tactics can affect watershed resources through fire line and large fuel-break construction, use of fire retardant, soil disturbance, and vegetation removal. Fire treatments can directly disturb fish when water is withdrawn from pump and dipping points, and from location of fire camps and other activities. Fish can also be entrained into improperly screen pumps, causing injury or mortality. Prescribed fire can help reduce effects from uncharacteristic wildfire by moving fuels toward a range of natural variability and reducing the severity of wildfire when it occurs. These controlled fires are often set when and where impacts to important fish habitat and populations would be minimal. Management-ignited fire would have the same general effects as wildfire, but these effects are assumed to be much less in intensity and extent.

Ground-disturbance from wildfire suppression, as well as the ground-exposing effects of wildfire, can result in a decrease in effective ground cover, leading to an increase in sediment delivery to streams. In addition, prescribed burning may result in an increase of nutrients and fine sediment into streams. Increased fine sediments affect developing eggs by filling interstitial spaces within stream substrate, and reducing or eliminating the supply of oxygen to developing eggs and the removal of waste products. Sediment can also be sufficient to reduce or eliminate the ability of juvenile fish to emerge from redds.

Chemical fire retardants used in wildfire suppression can have impacts to bull trout, anadromous, and other aquatic species. Retardants can have direct and indirect effects on salmonids. Large quantities of retardant can cause direct mortality. Indirect effects of retardants include mortality of invertebrates and eutrophication of downstream reaches (Spence et al. 1996).

Not all disturbances have the same effects on soil productivity and function. For example, wildfire can reduce soil productivity, but unless a substantial amount of the organic matter, grass residue, needles, and branches are consumed, loss of soil productivity may not be as high as it would be if soils were disturbed through displacement and compacted and whole trees were removed from harvesting activities. Because of the mosaic pattern wildfire produces, and the residual wood that is left on site, disturbance from wildfire usually has fewer implications for loss of soil productivity and function than disturbances that remove soil organic matter and increase bulk density. However wildfire often affects a much larger area as compared to mechanical harvest.

The effects of prescribed burning were identified as generally insignificant with regard to a wide range of hydrologic and water quality variables, (USDA Forest Service 1997). Severe wildfire can result in water-repellent soil conditions, and increased soil erosion can occur during intense rainstorms. Both water-repellent soil conditions and compacted soils can decrease soil-hydrologic functions (such as water infiltration, nutrient uptake, and biological activity) and increase erosion. The severity and longevity of declining soil productivity is generally greater under compacted soil conditions; however, the extent of area affected by wildfire is typically much greater.

All the Resource Protection Methods would mitigate general fire management effects under all alternatives. However, it is assumed that temporary and short-term impacts to fish, water quality, watershed conditions, channel conditions, and flow/hydrology would still occur where fire management activities take place. Impacts to RCAs and habitat may still occur in certain circumstances when no other suitable locations for incident bases, camps, heli-bases, staging areas, etc., exists. Delivery of chemical retardant, foam, and other additives near or on surface waters may occur when there is imminent threat to human safety and structures or when a fire may escape causing more degradation to RCAs, than would be caused by addition of chemical, foam or additive delivery to surface waters in RCAs. Conversely, where management treatments are used to reduce wildfire hazard, positive long-term effects may be realized.

<u>Potential Effects from MPCs and Uses</u> – Management treatment varies by alternative, depending on the amount of vegetation restoration emphasis, as reflected by MPC assignments. This indicator is used to display effects by alternative for Issues 1, 2, 3, and 4 in the Direct and Indirect Effects section below.

Non-native Plants - Noxious weeds are often treated using an integrated approach, with a combination of control methods that include mechanical, biological, and chemical. The effects of some of these methods are discussed here.

Effects from herbicide application depend on the type, extent, and amount of herbicide that is used, the sites' proximity to a stream or wetland, a stream's ratio of surface area to volume, and whether transport from the site is runoff or infiltration controlled. Chemical persistence in the soil profile and surface water depends on the potential for the chemical to leach through groundwater, the size of the treatment area, velocity of streamflow, and hydrologic characteristics of the stream.

Direct effects require that an organism and the chemical come in contact. Once in contact, the chemical must be taken up by the organism in an active form at a concentration high enough to cause a biological effect. Most direct effects of herbicides on listed salmon and steelhead are likely to be sublethal, rather than outright mortality. However, sublethal effects of chemicals and pesticides can play a significant role in reducing the fitness of natural salmonid populations. Scholz et al (2000), and Moore and Waring (1996) indicate that environmentally relevant exposures to diazinon can disrupt olfactory capacity needed for survival and reproductive success, both of which are key management considerations under the ESA (Scholz et al. 2000). The ecological significance of sublethal effects depends on the degree to which they influence behavior that is essential to the viability and genetic integrity of wild populations.

Indirect effects can include decreases in terrestrial or aquatic insects that result in a decrease in the food supply for fish, and reductions in cover and shade from riparian resources. It is assumed that many chemicals used will be benign. For example, glyphosate without surfactants (e.g., Rodeo®, Accord®) has little effect on fish. Some chemicals like picloram, which is highly soluble and readily leaches through the soil, may not be benign.

Mechanical treatments can result in localized soil disturbance as plants are pulled. Increased sediment to streams along road cuts and fills within riparian areas is possible, but the increase would likely be undetectable due to several factors. First, not all vegetation in a treated area would be pulled, so some ground cover would still be in place. Second, not all sediment from pulling weeds along roads would reach a stream because many relief culverts divert ditch flow onto the forest floor away from streams. Finally, hand pulling is very labor intensive and costly. Thus only a few acres per year could be treated using this technique across a watershed.

All the Resource Protection Methods would mitigate these types of general effects under all alternatives. However, it is assumed that temporary impacts would still occur where non-native plants are established and spread. Although many threats to water quality from chemical application may be reduced, they cannot be eliminated. This is in part due to the uncertainty surrounding sub-lethal effects to salmonids and other aquatic organisms. As discussed above, there are gaps in the scientific knowledge of how pesticides interact with the biology of migratory salmonids. Effects to salmonids may occur that are not readily apparent.

Noxious weeds can replace natural vegetation causing increased erosion, loss of shade, and less ground cover. For a more detailed discussion of these effects refer to the Non-Native Plant effects analysis.

Threats to water quality from fuel spills are greatly reduced, but are not completely eliminated. This is because some storage and use will still occur in RCAs or along roads where there is no other alternative. Spills and accidents may occur from this use, affecting aquatic resources.

<u>*Potential Effects from MPCs and Uses*</u> – The rates of establishment and spread are not expected to vary significantly by alternative (see Non-native Plants section in Chapter 3). Therefore, this analysis will not further address effects from non-native plants.

Impacts from noxious weeds treatments would most likely occur in those subbasins with extensive amounts of trails, roads, and other forest facilities (MPCs 3.2, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2). This is because the more sources of exposure, the higher the likelihood of infestation and the better access to detect and treat these infestations. Subbasins with the potential for more noxious weed treatments are Boise-Mores, South Fork Boise, South Fork Payette, Middle Fork Payette River, Payette River, North Fork Payette, Little Salmon, Brownlee Reservoir, Weiser River, Big Wood River, Upper Snake-Rock Rock, Goose Creek, and Raft River. Subbasins with large amounts of roadless and/or undesignated low road density areas (MPCs 1.1, 1.2, 2.1, 2.2, 2.4, 3.1, 4.1a, 4.1b, 4.1c) would likely only have localized infestation associated with access points. These subbasins are Hell Canyon, North Fork/Middle Fork Boise, Upper Salmon, Upper Middle Fork Salmon, Lower Middle Fork Salmon, Middle Salmon Chamberlain, South Fork Salmon River, Lower Salmon River, Camas Creek, and Little Wood River.

Minerals Management - An array of effects can occur with mineral management related to mineral extraction or facilities to process or transport the mined material. Effects are discussed for those mineral activities that typically occur within the Ecogroup area.

Hard rock mining can affect soil productivity and water quality through disturbance of varying amounts of surface and subsurface soil and the potential for the addition of large quantities of sediments, the addition of solutions contaminated with metals or acids, and the changes in channel formation and stability. Fine inorganic particles (like clays) settle slowly and may travel great distances from the point of their introduction and therefore may have a greater effect on water bodies such as lakes further from mining activities. Fine suspended material reduces the amount of light available for bottom-dwelling algae and plants, and thereby, biomass and primary production are diminished.

Acidification of surface waters mobilizes toxic metals naturally embedded in soils and streambeds. As surface water (including rain) washes through waste piles left from mining operations, it is acidified via iron oxidation and then flows into streams where metals are released and converted to forms which are available to aquatic life (Nelson et al. 1991). Acidification of surface waters can directly affect aquatic organisms through reduced egg viability, fry survival, growth rate, and other ills, or indirectly through toxic metals or substances that can affect growth, reproduction, behavior, and migration (Spence et al. 1996).

Suction dredging can increase turbidity. Where small amounts of fine sediment are worked and stream flows are high, only small increases in turbidity occur and effects are of small scale and short duration. Where large amounts of fine sediments are mobilized and stream flows are low or moderate, detectable increases in turbidity can be expected at the reach scale. Here, turbidity plumes can extend hundreds of feet downstream. In areas of concentrated suction dredging, the amount of fine sediment deposition is cumulative. Mobilized fine sediment settles downstream within slow water areas such as pools.

Suction dredging can cause streambank erosion by creating tailing piles that re-direct stream currents into streambanks. Suction dredging can also alter pool dimensions through removal or addition of stream sediment and wood. When pool size is greatly reduced or wood is removed from otherwise high-quality pools, overall pool quality is reduced. When sufficient amounts of sediment are removed from around large rocks, boulders, and wood that help form pools, their locations shift and individual pool stability is reduced. Suction dredging often increases pool depth and volume, increasing rearing habitat for some salmonids. However, bedload usually fills these pools during winter peak flows.

Some camping occurs in association with suction dredging that may involve a few individuals to groups for days to weeks at a single location. Since much of the camping occurs along streambanks outside of designated campgrounds, some loss of riparian vegetation and streambank hardening occurs. Campers may also collect firewood in the stream recruitment zone, reducing wood available for streambank stabilization and other stream processes.

All the Resource Protection Methods would mitigate these types of general effects under all alternatives. However, it is assumed that temporary and short-term impacts to soil productivity, water quality, watershed conditions, channel conditions and flow/hydrology would still occur where minerals activities take place. Actions where the Forest Service has limited discretion to influence management actions because of existing laws (1872 Mining Law, Mining and Mineral Policy Act of 1970, etc.) would also be more likely to have impacts to aquatic species and SWRA resources.

Potential Effects from MPCs and Uses – The level of activities is impossible to predict, but is not expected to vary significantly by alternative. Mining operations are more of a function of market values for mining products than from opportunity provided by the alternatives. The only variable between alternatives that may influence mining is the acreage that might be removed from mineral exploration due to wilderness recommendation and designation, but designation would require Congressional decisions, which are beyond the scope of revision. Therefore, this analysis will not further address effects from mineral activities.

While impacts do not vary by alternative significantly, they do vary between subbasins. The following subbasins are expected to have a high potential for continued mining activity due to mineral deposits. These subbasins include: South Fork and Middle Fork Boise River, Boise-Mores Creek, South Fork Payette River, South Fork Salmon River, Lower Middle Fork Salmon, Middle Salmon-Chamberlain, Big Wood River, Goose Creek, and Raft River.

Effects Methodology and Assumptions

This section presents key methods and assumptions that were used in the effects analysis for the issues and indicators.

Effects Indicator Determination Screens

A screening process was used to determine the indicators for effects that are analyzed by alternative. The first screen involved identifying the threats or potential impacts that could affect SWRA resources. The potential impacts were then screened through the filter of management direction under all alternatives to identify what effects would remain after all mitigation from that direction is applied. These effects are described in the General Effects section, above. The next screen looked at which of these effects would differ significantly by alternative and why. Typically, the potential for differences in effects was tied to the different allocation of MPCs by alternative. Each MPC represents a different management emphasis, and has a different set of associated standards and guidelines. The MPCs were also allocated by alternative in different combinations.

General Assumptions

A key assumption in this screening process was that, although effects from management activity are largely mitigated by management direction, those MPCs that emphasize active management (e.g., mechanical harvest, road construction, etc.) still have a higher potential for temporary and short-term risks to SWRA resources for two reasons. First, as more active treatments are applied, more protective measures may be needed to mitigate potential effects. It is assumed with the application of more protective measures, the risks of measures not being implemented directly increases. Second, it is assumed that the more management activities are applied to a specific location, the more the risk there is of impacts from those management disturbances, regardless of mitigation measures.

Another key assumption is that MPCs provide an indication of the management goals (i.e., desired outcomes) that subsequent site-specific projects would strive to meet or move toward. Neither the Forest Plans, or the EIS alternatives, or the MPCs authorize implementation of management activities described in the effects analyses. Thus, the mix of MPCs allocated under each alternative is more appropriately used in the EIS effects analyses as a means to differentiate between and compare alternatives. The MPC-based effects analyses compare potential effects from various management activities that could occur under various combinations of MPCs represented by the alternatives. These effects are modeled based on assumptions about the type, amount, and intensity of management activities that would be allowed or emphasized under each MPC. As stated above, the modeled effects in the EIS are designed to show relative differences in alternatives—not to accurately predict the amount or location of management activities that would occur during the planning period should that alternative be selected for implementation.

Another key assumption is that for other native aquatic species management for their habitats would be addressed by management for water quality to meet beneficial uses and for aquatic habitat in general, with the potential effects being the same as for Issues 3 and 4, respectively.

Issue and Indicator Methodology and Assumptions

Issues 1 and 2, Methodology - Based on Issue 2 being similar to Issue 1, the description of their methodologies and assumptions are discussed together. The subwatersheds identified in Issue 2 are a subset of Issue 1. The criteria for identifying the subwatersheds analyzed for Issue 1 are the same except that Issue 2 has the following additional criterion: subwatersheds that have been identified as a potential post-wildfire risk to human life, property, and/or municipal supply watersheds from post-wildfire floods, landslides, and debris flows.

Effects of the alternatives for Issue 1 were evaluated using the amount (percentage) of subwatersheds with high and extreme wildfire vegetation hazard rating and that are also highly vulnerable subwatersheds. Effects for Issue 2 were evaluated in the same way as Issue 1, but the set of subwatersheds used was more selective, as described above.

The subwatersheds for both Issues 1 and 2 were then compared to the assigned MPCs by alternative that had an emphasis and vegetation management tools (fire and mechanical treatments) available to reduce the uncharacteristic wildfire hazard, thereby lowering the risk of uncharacteristic wildfires. See the SWRA Technical Report for more detailed discussion on how this effects analysis was completed and the assumptions that were used.

The analysis by the SPECTRUM model provided only a general assessment of potential risks and effects from fire and mechanical vegetation management activities at the subbasin scale. It was not detailed enough to evaluate potential risks/effects at the subwatershed scale. Therefore, mechanical and fire use, based on MPCs, were instead used to evaluate relative risks from vegetation management activities at the subbasin scale. MPCs 2.4, 3.2, 4.1 c, 4.2, 4.3, 5.1, 5.2, 6.1, and 6.2) were considered to have a relatively high emphasis and more tools available to treat subwatersheds with high and extreme risks from uncharacteristic wildfire. MPCs 1.1, 1.2, 2.0, 2.1, 2.2, 3.1, 4.1a, and 4.1b were considered to have a limited emphasis and fewer tools. Percentages of subwatersheds with high treatment emphasis were compared to percentages of subwatersheds with limited treatment emphasis for the entire Ecogroup area.

Issues 1 and 2 Assumptions - Fire is a natural and an important ecosystem process. Effects from fire can vary depending on fire intensity, severity, and frequency—the primary factors that define fire regimes. Wildfires are defined as an "unwanted wildland fire" that can affect water chemistry, water quantity, and stream channel structure through changes in transpiration, infiltration, ground water recharge, erosion and mass wasting, riparian shading, and the recruitment and delivery of coarse woody debris. During the past century, fire suppression has altered fire regimes in some vegetation types and consequently, the probability of uncharacteristically larger and more severe lethal wildfires.

New information from the Interior Columbia Basin Ecosystem Management Project, and recent research (Meyer et al. 2001, Moody and Martin 2001a and 2001b, Rieman and Clayton 1997, Benda and Dunne 1997) have linked accelerated soil erosion, loss of nutrient base, and triggering of floods, landslides, and debris flows uncharacteristic of their normal pattern and frequency, to uncharacteristically large and lethal stand-replacing wildfires. Meyer et al. (2001) identify two contrasting erosional mechanisms and temporal periods over the post-wildfire period. Within the first few years, high rates of soil erosion, sediment delivery, and stream-channel-changing events can result following intense precipitation (typically in brief summer convective storms). Several or more years following wildfires, as soil tree-root strength declines from root decay, saturation of the soil profile can result in increased landsliding during prolonged, heavy, winter-spring rainfall and snowmelt. Data from Gray and Megahan (1981) suggest that it may require up to 20 years for root strength to be regained following wildfire.

These types of effects are especially a concern in subwatersheds that have high to extreme uncharacteristic wildfire hazard and high inherent vulnerability ratings. Uncharacteristic wildfire hazard is defined as the effect of wildfire on the vegetative conditions when it burns (rather than if it will burn) relative to the historical effect. Effects are dependent on potential vegetation group, size class, and canopy closure for forested vegetation, or cover type and canopy cover for non-forested vegetation. The hazard index ratings are low (0), moderate (1), high (2), and extreme (3). Additional information is located in the FEIS Chapter 3 in the Vegetation Hazard section.

Urban areas and rural developments continue to encroach on wild lands, even as wildfire risk in some areas increases. As wildfires become more intense and uncharacteristically large, the hazards to life, property, and/or municipal supply watersheds, both during and after wildfire, increase. Subwatersheds with these hazards in many instances are similar to wildland-urban interface subwatersheds (see Chapter 3, Fire Management). However, wildland-urban interface subwatersheds are different in that they may or may not be highly vulnerable and/or have a post-wildfire risk to life, property, and/or municipal supply watersheds from floods, landslides, and debris flows.

It was also assumed that these subwatersheds would likely require Burned Area Emergency Response (BAER) if uncharacteristically lethal wildfire were to occur within them. One of the main objectives in implementing BAER measures is to alleviate emergency conditions following wildfire to mitigate significant threats to health, safety, life, or property (FSM 2523). It was further assumed that wildfire suppression and BAER costs would increase significantly in subwatersheds with these conditions.

Management strategies (prescribed fire or mechanical vegetation treatment) that reduce these risks would help decrease the post-wildfire threats and associated BAER costs within these subwatersheds.

For this programmatic analysis the following additional set of assumptions were made:

- The main analysis assumption was—the lower the uncharacteristic wildfire hazard, the lower the wildfire-related potential for soil erosion, loss of nutrient base, floods, landslides, debris torrents, and the lower the threats to human life, property and/or municipal supply watersheds.

- Several communities depend on water from subwatersheds within the Ecogroup. The objective of the three National Forests within the Ecogroup is to manage for multiple uses by balancing present and future resource use with municipal water supply needs.

- Uncharacteristic lethal wildfire can profoundly reduce soil-hydrologic function, long-term soil productivity and riparian function and ecological processes when high intensity and high severity wildfire occur on a large percentage of these subwatersheds. However, when fire regimes are in balance with vegetation, landform, and climate, ecosystems are more resilient after disturbance and sustainable in the long term.

- Vegetation restoration activities that move vegetation toward historical ranges of variability will provide favorable conditions for soil-hydrologic functions and watersheds processes (ICBEMP 2000a).

Issues 3 and 4, Methodology and Assumptions - Shared indicators for Issues 3 and 4 are discussed below.

<u>Effects From Livestock Grazing, Methodology</u> **-** Effects were evaluated using the amount (percentage) of suited rangeland acres and the type of MPC (Less or More Restrictive) management strategy occurring within subbasins of concern.

There are generally three accepted grazing principles that affect plant physiology and succession. They are grazing frequency, intensity, and timing. Plant physiology, ecology, and response to grazing are key aspects to determining the effects of livestock grazing on rangeland vegetation and therefore on soil, water, riparian, and aquatics resources. The two grazing management strategies group MPCs with similar management approaches for these three livestock grazing principles as follows.

- *MPCs where Livestock Grazing Management Practices are More Restrictive* (MPCs: 1.1, 1.2, 2.1, 2.4, 3.1, 3.2, 4.3) - In general, these MPCs are more constraining on the timing, frequency, and intensity of livestock use, thereby affording more temporary and short-term threat reduction in moving the rangeland vegetation toward desired conditions. There are potentially less temporary or short-term risks of loss of vegetation, soil compaction, sedimentation, nutrient loading, loss of bank stability, and loss or disturbance of aquatic habitat. Also, the rate of recovery for vegetation, soil, watershed concerns, riparian resources, and aquatic habitat and subpopulations would be quicker.

- *MPCs where Livestock Grazing Management Practices are Less Restrictive* (MPCs 4.1, 4.2, 5.1, 5.2, 6.1, 6.2) - In general, these MPCs are less constraining on the timing, frequency, and intensity of livestock use, potentially increasing temporary and short-term risks to moving the rangeland vegetation toward desired conditions. There are potentially more temporary and short-term risks of loss of vegetation, soil compaction, sedimentation, nutrient loading, loss of bank stability, and loss or disturbance of aquatic habitat. Also, the rate of recovery for vegetation, soil, watershed concerns, riparian resources, and aquatic habitat and subpopulations is not expected to occur as quickly as it would be for the more restrictive approach.

Effects From Livestock Grazing, Assumptions - Standards and Guides provide protection to TEPC fish species and SWRA resources from grazing activities. However, the "less restrictive" grazing approach could have greater potential for negative impacts than the "more restrictive" approach due to less emphasis on protecting SWRA resources and maintaining natural processes.

These two grazing management strategies may have differing temporary and short-term effects based on their effects of grazing on rangeland vegetation and riparian functions and ecological processes. If the rangeland vegetation is managed toward desired conditions, it should provide favorable conditions for most soil-hydrologic and watershed processes. With the addition of proper timing of grazing seasons and management practices to protect stream banks and other riparian components, unfavorable conditions to aquatic resources can be kept to an acceptable minimum. Short-term restoration usually occurs only through implementation of more restrictive grazing management strategies. Either grazing management strategy provides for long-term restoration, but the more restrictive grazing strategy should provide for a higher degree of long-term recovery.

Effects From Motorized Trail Use, Methodology – The miles of motorized trail within recommended wilderness in Alternatives 4 and 6 were summarized by subbasin to determine where the most closures would occur. Once summarized, the location of remaining, opened trails were determined. The miles of trail in and outside of RCAs were summarized by subbasin.

Effects From Motorized Trail Use, Assumptions – It was also assumed that the more motorized trails and use in recommended wilderness areas (particularly RCAs within those areas), the greater the potential for impacts to SWRA resources and aquatic species. It was also assumed that subbasins that have more trails closed in recommended wilderness subbasins would have increased use of remaining motorized trails in and adjacent to those subbasins.

Effects of TMDL and 303(d) Restoration (Issue 3) and Effects from Aquatic Restoration (Issue 4), Methodology - The evaluations for these two separate but related indicators have many similar methods and assumptions. The similarities will be discussed first followed by identification pertaining to the respective water quality restoration issue/indicator and Aquatic Restoration issue/indicator. Refer to the SWRA Current Conditions section for a detailed discussion of determining the appropriate subwatershed restoration type, subwatershed restoration priority and determination of ACS Priority subwatersheds.

The degree that MPCs emphasized restoration or conservation was central to analyzing the benefits of restoration for Issues 3 and 4 or potential effects from the lack of restoration associated with Issue 4. The number of subwatersheds recommended as high priority by WARS for active and passive restoration, and conservation were compared to the MPC assignments for each subwatershed within their respective subbasin. Only the high priority subwatersheds identified by WARS, or ACS priority subwatersheds, were considered because these subwatersheds have the highest likelihood of having water quality and aquatic restoration in order to concentrate restoration/recovery efforts into meaningful areas, given existing and potential future staffing and funding limitations.

Subwatersheds where active restoration was recommended by WARS, and where a 3.2 MPC was assigned, were considered to provide the highest emphasis and most appropriate type of restoration. This is because the 3.2 MPC emphasizes active restore of degraded aquatic, terrestrial and watershed conditions. Table SW-10 displays the MPCs and their relative management emphasis and available tools to perform the type of restoration or conservation.

Table SW-10. Watershed and Aquatic Restoration and Conservation Strategies and Tools by MPC - Likelihood that Assigned MPC has the Most Appropriate Management Emphasis to Achieve or Maintain Desired Conditions

MPC	WARS Recommendation		
	Active Restoration	Passive Restoration	Conservation
1.1, 1.2	Low	High	High
2.1	Low	High	Moderate
2.2	None	High*	High**
2.4	Moderate	Moderate	Low
3.1	Low	High	High
3.2	High	High	Moderate
4.1a, 4.1b	Low	High	High
4.1c	Low	High	High
4.2	Moderate	Low	Low
4.3	Moderate	Low	Low
5.1/6.1	Moderate	Moderate	Low
5.2/6.2	Moderate**	Moderate	Low
8.0	Moderate	Low	None

*Because RNAs are usually very small, these restoration ratings are not expected to influence the overall subwatershed very much.
**Some restoration anticipated in terms of K-V and mitigation funding from timber receipts and range betterment funding.

Effects of TMDL and 303(d) Restoration (Issue 3) and Effects from Aquatic Restoration (Issue 4), Assumptions - Regardless of the restoration/conservation MPCs and how they were applied, all subwatersheds with listed 303(d) water bodies, TMDLs, and aquatic species would receive special emphasis to improve watershed and habitat conditions under all alternatives due to the Forest Service's legal obligation to meet requirements under the Clean Water and Endangered Species Acts. For the action alternatives, this obligation has been addressed by specific Forest-wide and Management Area direction in the revised Forest Plans to: (1) restore 303(d) water bodies, (2) implement TMDL plans, (3) restore or maintain habitat for listed fish species, and (4) protect SWRA resources. This direction would help improve water quality and assist in de-listing 303(d) water bodies, TMDLs, and threatened and endangered fish species by helping to achieve conditions needed for these subwatersheds to fully support their beneficial uses.

In areas where the SWRA restoration emphasis (as identified by MPC) was lower, the potential for SWRA resource restoration was considered lower because the existing watershed restoration needs would not be as high a priority for treatment. This risk is related more to the rate of recovery than it is to potential impacts, particularly for areas in need of active restoration. All areas in need cannot be treated simultaneously due to a finite amount of funding, personnel, and equipment required for active treatments. Therefore a system of prioritization is needed to help ensure that active treatments occur in the appropriate areas in a timely manner. Passive restoration or conservation strategies and areas are not as much of a concern, as it is assumed that current conditions in these areas are typically functioning appropriately or functioning at relatively minor risk.

Subwatersheds designated as an ACS priority were considered a high priority for SWRA restoration or conservation regardless of the MPC designation. It was assumed in subwatersheds with moderate or low aquatic restoration emphasis MPCs that the ACS priority designation would still result in watershed and aquatic restoration or conservation being completed, but at a slower rate of recovery. However, the ACS designation would not necessarily implement the appropriate type of restoration recommended by the WARS. For example, the WARS may recommend active restoration, but the MPC may emphasize passive restoration or conservation. Restoration in ACS priority subwatersheds with moderate or low SWRA restoration emphasis MPCs may also have to compete more with other resource priorities. On the other hand, other resource priorities, such as timber harvest, may also provide additional funding and incentive for watershed restoration where it is most needed. It is assumed, however, that enough restoration would be completed so that current conditions would be either maintained or slowly trend toward desired conditions of SWRA resources.

Only the high priority subwatersheds identified by WARS, or ACS priority subwatersheds, were considered in the analysis because these subwatersheds have the highest emphasis for having water quality and aquatic restoration in order to concentrate restoration/recovery efforts into meaningful areas, given existing and potential future staffing and funding limitations. However, the appropriate restoration or conservation strategy could also be applied as needed in any area under any given project because, as mentioned above, the Forest Service must meet its legal obligations under the Clean Water and Endangered Species Act.

For Issue 3, restoration actions leading to beneficial use attainment and the delisting of subwatersheds that have TMDLs or 303(d) water quality limited water bodies, should be more likely to occur with a faster rate of recovery where a management prescription is applied that emphasizes the appropriate watershed and aquatic restoration or conservation strategies. Determination of "appropriate" restoration/conservation strategies is based on two general assumptions/criteria:

- The subwatershed's dominant type of restoration/conservation strategy identified by the Watershed and Aquatic Restoration Strategy (WARS) is appropriate or "a good match" with the MPC restoration emphasis that is applied to that subwatershed, and/or

- The subwatershed has been identified as an ACS priority subwatershed that serves as an emphasis to initiate the appropriate watershed restoration identified for that subwatershed regardless of the MPC applied.

For Issue 4, these two general assumptions also apply. In addition, the following assumption related to aquatic species applies and was used in the analysis.

- Those alternatives and subwatersheds with the appropriate restoration and conversation emphasis would have greater potential for fish habitat and population recovery over the short and long term.

Effects From Timber/Vegetation Activities (Including Roads and Fire Use), Methodology **–** This indicator compares two aspects of both Issue 3 and Issue 4. The first aspect is the amount of suited timberland acres by subbasin. The second aspect is the use of the Cumulative Watershed Effects model (CWE) similar to that described in (Menning et al. 1996), which analyzed forest vegetation management activities (mechanical harvest, fire use, and road-related activities) by alternative for each subbasin to determine their potential effects on soil, water, riparian conditions, and selected fish species.

Suited timberland acres were assigned by MPC. MPCs 4.2, 5.1, 6.1, 5.2, and 6.2 contain suited timberlands, while the remaining MPCs do not. Each alternative has a different amount and distribution of these MPCs with suited timberlands. Refer to the Timberland Resources section in Chapter 3 for more information on suited timberlands within MPCs.

The CWE model was specifically developed for use with the SPECTRUM and RELM models to assist in analyzing mid-scale (subbasin) effects associated with forest vegetation management activities by alternative. The CWE model estimated each alternative's relative amount of potential disturbance associated with forest vegetation management activities required to meet forest vegetation desired conditions. The CWE model evaluated an array of forest vegetation management-disturbing activities as a common currency termed "equivalent replacement treatment" (ERT) acres. The disturbance associated with an acre of mechanically harvested clearcut served as the common denominator. This acre of mechanical clearcut harvest was given the unit of measure of 1 ERT. All other forest vegetation management activities were measured in ERT units relative to one ERT equal to one acre of mechanical clearcut. Each forest vegetation management disturbance activity has a coefficient based upon the associated type and intensity of activity.

The SPECTRUM model estimated (for 10 year averages) the amount and timing of forest vegetation management activities based on a complex data set, including the eleven potential vegetation groups (PVG), current vegetation conditions (early successional, late seral, etc), MPC assignment, and desired conditions of forest vegetation. Arrays of type and amount of forest vegetation management activities, or ERTs, were then summed up by the SPECTRUM model per Forest and displayed as decadal acre averages. The SPECTRUM results were not spatially sufficient to identify CWE at a subbasin scale to assess associated risks to SWRA resources. In order to improve the CWE model, the RELM model was used to spatially disaggregate the SPECTRUM outputs/activities (ERT acres) to individual subbasins over time. Each subbasin had the total number of ERT acres determined for each alternative. An estimate of the amount of

ERT acres was determined and averaged for the two and five decadal time periods for each subbasin. These decadal averages were used to coincide with the fish viability assessments at 15- and 50-year intervals and approximate short- and long-term effects for other SWRA resources.

Average decadal amounts are assumed to provide good relative estimates of the potential implementation of forest vegetation resource programs by alternative. The RELM model prorated the SPECTRUM vegetation management outputs/activities to each subbasin based on the individual subbasin's PVGs, current vegetation conditions, MPC assignments, and desired conditions for forest vegetation. See Appendix B to this EIS, "Forest Vegetation Modeling Desired Conditions", for more information on the SPECTRUM and RELM models. See the SWRA Technical Report for more detailed discussion and descriptions of the CWE analysis.

The relative importance and sensitivity of a subbasin to disturbance from forest management activities was addressed by assigning one of three sensitivity classes that set a threshold on the amount of ERT acres allowed per decade. The percent ERT threshold serves as a "Threshold of Concern" (TOC) used as a relative evaluation of the amount of forest vegetation management activities occuring within each subbasin.

The sensitivity class decadal percent ERT values for the subbasins are as follows: Sensitivity Class I = 6 percent ERT, Sensitivity Class II = 8 percent ERT, and Sensitivity Class III = 13 percent ERT. Subbasins with a lower sensitivity class value required less ERT acres to surpass the TOC. Determination of the baseline ERT TOC was based on two criterions. The first was the use of Equivalent Clearcut Area Watershed Condition Indicator found in Appendix B of the revised Forest Plans, and the second was Regional guidance and revised Forest-wide direction (Standard SWST02) that limits detrimentally disturbed soil conditions.

The ERT threshold (TOC) percentages vary by sensitivity class. The following criteria were used to determine each subbasin's sensitivity class (See the SWRA Technical Report for more detailed information on the Sensitivity Classes and how they were developed):

Sensitivity Class I = ERT TOC of 6 percent

a. ACS priority subwatersheds
b. TMDLs within subwatershed
c. Strong populations of bull trout or anadromous (not including migratory habitat for bull trout or anadromous) and isolated local populations of bull trout within the subwatershed.

Sensitivity Class II = ERT TOC of 8 percent

a. Designated Critical Habitat of Sockeye and Chinook salmon within subwatershed
b. Presence of any listed fish species (including migratory)
c. Presence of listed 303(d) water quality limited water bodies
d. High subwatershed vulnerability rating

Sensitivity III Class = ERT TOC of 13 percent

a) All remaining subwatersheds.

Sensitivity class values were assigned to each subbasin, based on subwatershed values pro-rated and aggregated up to the subbasin scale. The individual sensitivity class value became the subbasin's threshold of concern (TOC), against which the ERT decadal acreage percentages were measured to determine whether the ERT activity would exceed the TOC.

The total ERT acres for each subbasin were then divided into the total acres within the subbasin to determine a percent of ERT acres. The subbasin ERT percent was then divided into the assigned sensitivity class ERT percent, resulting in a percent TOC estimated for each subbasin. These TOC percents were then calculated as averages for both two and five decades. TOC values below 100 percent are below a level of any level of concern for the SWRA resources.

For example, if a subbasin of 400,000 acres has a total of 5,000 ERT acres for the 2-decade average, this equates to 1.25 percent ERT acres. If the sensitivity class for this subbasin is 6 percent, then the TOC is 1.25 percent divided by 6 percent, which equals 21 percent. This value of 21 percent is well below the threshold of concern of 100 percent, and should therefore not represent any appreciable effect to the SWRA resources.

The CWE model used at the mid-scale is a useful method for evaluating the effects for forest vegetation management strategies for a number of reasons. First the CWE method provides a quantitative accounting and analysis process. The SPECTRUM and RELM models account for most of the forest vegetation management outputs/activities, and the outputs can be used to estimate relative risks/effects dispersed in time and space. Second, the CWE is similar to the correlations with some ecological measures of instream effects (Spence et al. 1996, McGurk and Fong 1995, Reid 1993). Third, there is some theoretical basis for linking CWE to measures of risks/effects (Menning et al. 1996). Fourth, the CWE methodology has greater consideration of the effects of fire use than do other models and is similar to other commonly used models used at finer scales. Fifth, for this size analysis (a large mid-scale programmatic plan), other assessments were either a great deal coarser (no spatial or temporal scale) or non-existent.

Effects From Timber/Vegetation Activities (Including Roads and Fire Use), Assumptions – For the suited timberland analysis, MPCs 4.2, 5.1, 5.2, 6.1, and 6.2 with suited timber acres that can contribute to the allowable sale quantity are considered to have a higher level of threat to SWRA resources than other MPCs. The suited timber MPCs are assumed to have more management tools to treat vegetation, and therefore a higher potential for ground-disturbing management activities to be implemented. It is assumed that nearly all road construction is closely aligned with the management of lands in the suited timber base. Thus, road density may increase during efforts designed to help achieve timber or restoration objectives under 5.2 and 5.1 MPCs. Increases may be temporary or combined with road restoration treatments. Subbasins with these MPCs are assumed to have more management tools to treat vegetation and thus more potential effects to SWRA resources. MPCs 3.2, 4.1c, and 4.3, while not having suited timber base, are assumed to have similar vegetation management tools (although road construction is more constrained) as those MPCs that have suited timber base and therefore the same level of potential effects to SWRA resources.

For the ERT analysis, it was assumed that subbasins with less than 100 percent ERT acres represent a low risk to SWRA resources, as 100 percent represents the threshold of concern (TOC). At less than TOC, the amounts of forest vegetation management activities are assimilated within the subbasin, with very low risks for negative effects. The alternatives and subbasins that exceed TOC (100 percent ERT acres) would have an increased concern for temporary and short-term risks to SWRA resources. This potential would be mitigated greatly by management requirements designed into the alternative; however, potential effects would still exist and vary by alternative.

For Forest Plan Revision (a mid-scale programmatic planning effort), a mid-scale CWE method was needed that used with the Forest Vegetation Model (SPECTRUM) to assist in identifying potential effects associated with a variety of forest vegetation management activities (mechanical harvest, road and fire use related activities). The CWE method also needed to be reproducible over large areas, spatially and temporally adaptable, and consistent. The modeled effects in this analysis are designed to show relative differences in alternatives—not to accurately predict the amount or location of management activities that would occur during the planning period. Other appropriate analyses would be conducted at the project level.

This CWE method was designed to provide a screening tool for identifying subbasins with the potential for concentrated forest vegetation management activities and associated risks to listed fish species, their habitats, and other SWRA resources. The method is similar (but less specificity based on the mid-scale programmatic nature of Forest Plan Revision) in concept to other models such as the Equivalent Roaded Area (ERA), Equivalent Clear-cut Area (ECA), BOISED Sediment Yield Model, and the Cumulative Watershed Effects Process for the State of Idaho. These various models have been used throughout the National Forests (at finer scales) and are similar in that they account for a variety of management activities correlated to a common unit, and measure effects from those activities on watershed functions and aquatic systems.

Issue 4, Methodology and Assumptions

Effects from Wildfire Vs. Management to Reduce Wildfire Hazard, Methodology - The SPECTRUM model analysis provided only a general assessment of potential risks and effects from fire management activities at the subbasin scale. It was not detailed enough to evaluate potential risks/effects at the subwatershed scale. Therefore, mechanical and fire use, based on MPCs, were instead used to evaluate risks from management activities.

Potential effects to aquatic resources were analyzed by comparing the MPCs (3.2, 4.1 c, 4.2, 4.3, 5.1, 5.2, 6.1, and 6.2) that have a high emphasis and more tools available to treat subwatersheds with high and extreme risks from uncharacteristic wildfire to MPCs (1.1, 1.2, 2.0, 2.1, 2.2, 3.1, 4.1a, and 4.1b) that have a limited emphasis and fewer tools. Acres of high treatment emphasis were compared to acres of limited treatment emphasis for each subbasin.

High and limited emphasis MPCs in subwatersheds with high and extreme risk from uncharacteristic wildfire were also overlaid with the population status (e.g., strong, depressed, and isolated local population) of bull trout, steelhead trout, and chinook salmon. This was done to evaluate the risks and or benefits from management treatments. It also assessed the risks from limited treatments that would maintain a high risk from uncharacteristic wildfires.

<u>*Effects from Wildfire Vs. Management to Reduce Wildfire Hazard, Assumptions*</u> - It is assumed that potential effects from management activities are greatest in those subwatersheds with a high risk from uncharacteristic wildfire and high emphasis MPCs that require both mechanical and prescribed fire treatments, moderate in those subwatersheds with limited emphasis MPCs requiring mechanical and fire treatments, and lowest in subwatersheds with limited emphasis MPCs requiring only prescribed fire. However, it is recognized these effects are more complex than these general assumptions portray. Effects will vary as site conditions change and with the intensity of each treatment. For example, helicopter harvest to thin vegetation and reduce fire risk would create relatively little risk to SWRA resources compared to harvest involving roads and skid trails.

Where depressed or isolated fish populations are present, it is assumed that the risk of uncharacteristic wildfire in the short term is greater than the risk of mechanical and prescribed fire to treat vegetation in some situations.

The influence of fire on persistence of native salmonid populations is highly variable. However, several elements appear to be critical for populations to persist fire and other types of disturbances. First, available evidence suggests fish populations are more likely to occur, and thus persist, in larger, less isolated habitats (Dunham et al. 1997, Rieman and McIntyre 1995, Dunham and Rieman 1999, Dunham et al. 2002). Populations that occupy a greater number of watersheds are more likely to occur in a broader diversity of habitat conditions allowing them to better survive disturbances. Second, populations that have complex life histories provide temporal and spatial hedges against local extinction following catastrophic disruption. Third, in larger interconnected systems, fish populations appear to be more resilient to the effects of fire. The importance of connectivity was evident in studies of salmonids responses to fires that burned through two tributary streams in the Boise River basin in the early 1990s (Rieman et al. 1997). In one stream, a local population of bull trout was probably extirpated, at least temporarily, following a severe burn and associated channel disturbances. The population was reestablished within a year through spawning returns of migratory individuals that were presumably outside of the system during the fire and related disturbances. Finally, larger populations are more likely to persist than smaller populations from disturbance events.

In watersheds where the threat of large fires is high, local populations of sensitive aquatic species may be at risk because they are isolated or are very small (Kruse et al. 2001). Fires burning over large areas are likely to influence more habitats simultaneously, compromising the spatial and temporal diversity in habitat conditions and population dynamics believed to be important to the stability and persistence of species and populations. Such effects might be particularly important where populations and habitats are already degraded. Because many of the remnant populations of fishes are already depressed, small or isolated, they lack the resilience, diversity, or demographic support to rebound from disturbance (Rieman and Dunham 2000). In some cases, local extinctions have been observed in response to fire, particularly in areas where populations of fishes have been isolated in small headwater streams (Rieman et al. 1997).

The risk from large, uncharacteristic wildfires could lead to long-lasting effects that may further stress isolated and depressed populations. It is believed that prescribe fire and select mechanical treatments can reduce some of these risks. It is also realized that past timber harvest activities have contributed to degradation in aquatic ecosystems, and that emphasis on timber harvest and thinning to restore more natural forests and fire regimes represents a threat of extending these problems. Our coarse assessment of benefits from management treatments is not an endorsement of full-scale treatments, over thousands of acres. At some point management actions would pose too great of a risk to populations. This is why careful analysis at the project scale will be required to determine the best course of action in any subwatershed. However, because many depressed populations lack the numbers to rebound quickly and isolated populations lack the connectivity to re-colonize burned areas, some level of management treatments, combined with other restoration, is appropriate to reduce fire risks in certain circumstance. Brown et al. (2001) and Rieman et al. (in press) have come to similar conclusions stating that active management to reduce the impact of fires and fire suppression actions could be an important short-term conservation strategy. Mealey and Thomas (2002) also have concluded that reducing the threat of uncharacteristic wildfires could be critical to short-term survival of some fish population.

Where strong fish populations are present, it is assumed that the risks of mechanical and prescribed fire treatments are greater than the risk of uncharacteristic wildfire.

Strong populations are believed to retain many of the population characteristics and occupy watershed with the habitat characteristics to withstand the effects of large, uncharacteristic fires. In particular, strong populations generally have good connectivity that allows them to re-colonize habitat that is altered from large fires. Many of the remaining strong populations within the Ecogroup also occur in unroaded or lightly managed subwatersheds. It is assumed that effects from treatments in these areas may be too great to the last remaining strongholds, even with following forest-plan management direction. Attempts to minimize the risk of large fires by expanding timber harvest, risks expanding the well-established negative effects on aquatic systems. The perpetuation or expansion of existing road networks and other activities can erode the ability of populations to respond to the effects of fire and large storms and other disturbances that we cannot predict or control (National Research Council 1996). Our assumptions should not be interpreted as an endorsement of no treatments in stronghold subwatersheds. Certain circumstances may warrant limited treatments in specific areas. This is again why careful project level analysis will be required to determine the best coarse of action.

For this programmatic analysis the following set of assumptions were made:

- The risk of uncharacteristic wildfire in short-term is greater than the risk of mechanical and prescribed fire to treat vegetation in some situation where depressed or isolated local fish populations are present. Depressed and isolated populations could be vulnerable to the effects of intense or very large wildfires. Risks of fire are likely most important for aquatic ecosystems that have been seriously degraded, fragmented, and to species that have very specific habitat requirements.

- The risks of mechanical and prescribed fire treatments are greater than the risk of uncharacteristic wildfire where strong populations are present. Watersheds that support healthy populations may be at greater risk through disruption of watershed processes and degradation of habitats caused by intensive management than through the effects of fire.

- Short term effects from treatments will be mitigated to the fullest extent possible.

- If threats are too great to a fish population, projects will be deferred until conditions that limit fish populations are addressed.

- Where treatments to reduce fire risk occur, temporary or short-term effects from treatments will be mitigated to meet the intent of SWRA Standards 1 and 4. This mitigation may include completing needed aquatic restoration prior to fire management treatments being implemented.

- The fewer management tools available to restore natural vegetative conditions, the greater the risk to depressed and isolated local populations from uncharacteristic wildfire.

Cumulative Effects – Issue 4 Only

The relative level of risk associated with cumulative effects was evaluated for TEPC fish species and SWRA resources. Those subbasins that potentially have more vegetative activities (ERT acres above TOC), grazing (high amount of suited rangelands with less restrictive management direction), and fire/mechanical treatments (high percentage of stronghold subpopulations that may be treated), less aquatic restoration, degraded baselines, and limited federal ownership are likely to have more risks of cumulative effects. Each of these indicators was assigned a relative risk based on a rating scale of 1 (low) to 3 (high) and key effects analysis assumptions (Table SW-11). Indicators were totaled for each subbasin and alternative. A maximum score of 18 was possible for subbasins where all indicators applied. Eighteen represents the maximum relative amount of cumulative effect potential, and 6 represents the minimum amount. Subbasins and alternatives with higher scores have a greater potential for cumulative effects. Scores in the 6 to 10 range generally represent a relatively low potential for cumulative effects.

Table SW-11. Projected Level of Risk by Resource Activity

Cumulative Effects Criteria	Level of Risk		
	High (3)	Medium (2)	Low (1)
SWRA Restoration Good Matches	<33% of subwatersheds are good matches	34-66% of subwatersheds are good matches	>67% of subwatersheds are good matches
Rangeland Suitability and Less/More Restrictive Grazing Strategies	Higher % suitability and higher amount of less restrictive grazing strategy	Higher % suitability and lower amount of less restrictive grazing strategy	Lower % suitability and lower amount of less restrictive grazing strategy
ERT acres vs. TOC values at 20 yrs.	>100%	N/A	<100%
Risk of Fire Treatment to Strongholds	Any Stronghold Treated	NA	No Strongholds Treated
Amount of On-going State, Private, and Federal Activities (Based on landownership and CWE write-up)	<33% of subbasin in Federal Ownership	34-66% of subbasin in Federal Ownership	>67% of subbasin in Federal Ownership
Baseline Condition	Majority of pathways FUR	Majority of pathways FR	Majority of pathways FA

Fish Species Viability

Fish Habitat Analysis - Benefits to fish habitat varies according to the probability for active restoration in subwatersheds functioning at unacceptable risk; passive restoration for areas that are at, or very close to, functioning appropriately with no fish strong local subpopulations; and conservation management for those functioning appropriately supporting strong local subpopulations. The types of restoration are:

- *Conservation* - All key ecosystem components are at desired conditions and functioning appropriately. Management is solely protection and nothing changes from status quo. No land disturbances or temporary risks to fish habitat or local subpopulations would occur. Long-term active maintenance may be necessary to keep most of the resource values within desired conditions, as systems are typically dynamic in nature.

- *Passive* - Some risk is noted as components are not at desired conditions and only land management direction changes are used to correct degradation problems. Restoration occurs at a natural rate of recovery. Very little land disturbances and temporary risks to aquatic resources would be anticipated. Long-term risks to vegetation and soils may be evident.

- *Active* - Enough risk is apparent to where capital investments are deemed necessary to encourage recovery. It is judged that natural rates of recovery are not sufficient and require assistance through deliberate mitigation. Temporary risks of impacts to fish habitat and subpopulations can occur. Long-term risks to other resource values (vegetation, soils, etc.) are minimized.

After a functioning risk was determined for each subwatershed (geomorphic integrity, water quality integrity, and aquatic properly functioning condition), the subwatershed was evaluated through assignment of MPCs which have either a low, moderate, or high likelihood of being managed to attain desired conditions during the short term through either active or passive restoration or; maintaining existing conditions through conservation measures. The higher the relative restoration value, the better the chance habitat would support fish subpopulations at viable levels. A high likelihood of managing for DFC attainment in the short term through active management would encourage high risk aquatic habitat to recover much faster than a low or moderate likelihood of DFC attainment would, or for that matter, than if passive restoration or conservation management was assigned.

Active restoration assigned to subwatersheds functioning appropriately would inefficiently use limited funding and could produce unnecessary temporary risks of impacts to fish habitat or local subpopulations. Passive restoration or conservation management assigned to habitat requiring active restoration would not move habitat conditions toward desired conditions in the short term. Therefore, the most effective way to analyze fish population viability is to see how active restoration is applied to those watersheds that are not properly functioning or functioning at risk, and how passive restoration or conservation practices are applied to those subwatersheds that are functioning appropriately.

Emphasizing conservation practices for resident fish strong local subpopulations within watersheds that are at desired conditions, coupled with emphasis for active restoration for resident fish strong local subpopulations within more risky watersheds, will increase the chance of meeting viability needs for resident fish. The high likelihood of managing for desired conditions during the short term through restoration for highly isolated resident local fish subpopulations, will also help protect and restore resident fish.

It is assumed that as existing subpopulations increase in numbers, population density will force some individual fish to vacate their existing habitat and seek suitable unoccupied habitat elsewhere, therefore expanding distribution. This should also improve genetic drift and recruitment to prevent stochastic events from threatening population survival. It should be noted, however, that because bull trout exhibit a patchy distribution even in pristine habitats, these fish should not be expected to simultaneously occupy all available habitats even after restoration has occurred (USDI FWS 2002).

By managing aquatic habitat to provide for viability of the selected representative fish species, the habitat should also be capable of supporting viability for other native and desired non-native fishes. Revision is also assuming that the standards and guidelines that are designed to protect riparian resources will be adequate to maintain viability for the non-fish aquatic species (amphibians, mollusks, etc.). Also standards and guidelines should protect those non-fish aquatic species occurring in high mountain lakes by controlling indiscriminate stocking of exotic fish that could prey upon these native organisms.

Fish Population Analysis - Discussions with Kerry Overton (Rocky Mountain Research Station) revealed that addressing fish populations at the metapopulation scale is most appropriate for determining population survival. McElhany et al. (2000) defines a metapopulation as a population of populations, or a set of populations that is spatially structured fundamentally depending on habitat quality, spatial configuration and dynamics, and the dispersal characteristics of individuals within the population. Metapopulations provide a mechanism for spreading risk of extirpation because the loss of all subpopulations is unlikely. For resident fish, Overton correlates metapopulation with the subbasin, which we have also correlated with "core area" used by the FWS. For anadromous species, the subbasin is more akin to a subpopulation. Consequently, this BA used the subbasin scale as the spatial level to address metapopulations for resident species. The subbasin was also used for anadromous species.

Four fish species were used in the viability analysis. These species are spring/summer chinook salmon, steelhead trout, Yellowstone cutthroat trout, and bull trout. These species will represent other at risk species (e.g. sockeye salmon, fall chinook, and westslope cutthroat) due to similar habitat requirement, threats to each species, and overlap in distribution. Only those subbasins where these species currently occur (strong, depressed, migration) were considered. Each species was addressed individually in the process.

Two timeframes were used for population rehabilitation—15 years and 50 years. The former represents the typical Forest Plan lifecycle, and the latter is the five decadal period used in planning analyses. Fifty years should be a long enough period to reflect habitat and population responses to restoration efforts.

The degree that MPCs emphasized restoration or conservation was central to the viability analysis. Relative risk of extinction was assessed for each species by comparing spatial distribution of that species to habitat risks to assess where emphasis for restoration is most needed. By overlaying the

MPC restoration assignment, it was determined if the appropriate type (conservation, passive, or active) and management emphasis of the MPC to attain PFC (low, moderate, and high) would occur and the results discussed.

Although Forest-wide and MPC direction provide a high level of protection, this protection alone does not eliminate all threats to subwatersheds. A lack or delay of restoration where needed may also pose a threat to depressed fish populations. If a WARS high-priority subwatershed has an MPC with a low or moderate restoration emphasis, it is considered to be a higher risk to fish populations than if the MPC has a high restoration emphasis. This is because some threats (e.g., undersized culverts or poorly constructed roads) can only be addressed through active restoration. If not addressed, these problems will continue and may become worse with time.

Remaining effects from grazing, timber harvest, roads, recreation, uncharacteristically wildfire, etc., were evaluated for each subbasin and summarized by alternative to determine if these activities reduced the benefit of restoration or conservation practices in regards to overall species viability at the subbasin scale. Potential effects from lethal fires were also considered.

The only population risk used in this analysis will be the past stocking of brook trout as they may affect bull trout. IWWI data showing distribution of brook trout in bull trout habitat indicate threats to the bull trout from exotic introduction. If brook trout are present, bull trout populations may be limited by these population risks and most likely would not strengthen in 50 years even if the habitat improved. Rainbow trout has been stocked so widespread that we are assuming that most cutthroat trout populations in the Ecogroup could be threatened by this exotic fish introduction.

All of the subwatersheds within subbasins with listed fish populations were evaluated to determine if those now absent of fish could be readily re-colonized. For subwatersheds now absent of listed fish species, four conditions had to be met before a subwatersheds could be re-colonized. First, a subwatershed must have habitat restoration highly emphasized by the selected alternative. Second, it must be hydrologically linked to allow re-colonization to adjacent subwatersheds within the same subbasin. Third, it must have historically supported these species. Finally, adjacent subwatersheds must currently support the listed fish species. Recolonization applies mainly to bull trout, but could include anadromous species where habitat degradation is the cause for local extirpation and ocean access still remains.

Habitat improvement should make these areas more attractive for adjacent local populations to re-colonize. It was also assumed that, as existing populations increase, population density would force some individual fish to vacate their existing habitat and seek suitable unoccupied habitat elsewhere, thereby, expanding their distribution.

Those subwatersheds experiencing depressed or absent subpopulations, but that have properly functioning watershed conditions, may not show improvements to subpopulation trends in this analysis. The assumption is that habitat is probably not the limiting factor to the population, and therefore habitat improvement would not restore fish numbers. Some of these areas, such as wilderness, may inherently only support depressed populations. Also, population risks (exotic fish stocking, diseases, harvest, predation, etc.) may be limiting population recovery. For anadromous species population recovery may be more limited by off-Forest migration impediments or other impacts.

This viability analysis does not determine subpopulation numbers that will be attained by each alternative. However, it does qualitatively estimate how subpopulations may respond to restoration, conservation, and other management actions. Although many subpopulations are predicted to increase, declines could still occur for some species regardless of future land management activities. Past management activities in some subwatersheds may have so altered watershed or habitat conditions that risks to listed fish species could not be reduced in the short term. Subpopulations that are stable, but small are also vulnerable to chance environmental events such as floods, fires, etc. Isolated subpopulations in high quality habitats could be vulnerable to permanent extinction through inbreeding and loss of genetic fitness.

Methods for Assessing MIS Species

Potential population increases or decreases, modeled by the viability analysis, were used to make inferences on changes to the spatial patterns of bull trout. As watershed conditions improve, existing bull trout populations would also improve and unoccupied habitat could be recolonized. In time, stronger populations would result in more dispersed and resilient metapopulations across each subbasin. Bull trout populations in larger, less isolated, and less disturbed habitats may be more likely to persist (Rieman and McIntyre 1995). Smaller patches are likely to support smaller local populations and fewer or less diverse habitats (Rieman and McIntyre 1995). The change in spatial pattern and population size over time would be an important way to determine the success of restoration efforts and minimization of project effects for this MIS species.

Direct and Indirect Effects By Issue and Alternative

Effects on Soil Water and Riparian Resources - Issue 1

High levels of uncharacteristic wildfire hazard within highly vulnerable subwatersheds increase the risk of large, uncharacteristic wildfires and their potential for loss of soil-hydrologic function and long-term soil productivity. Alternatives that have a higher emphasis and tools available to lower the wildfire hazard reduce this risk. Reductions in uncharacteristic wildfire hazard increase opportunities to move toward or maintain the desired vegetative conditions over time. They also reduce the risk of undesirable impacts to soil-hydrologic function and long-term soil productivity. Table SW-12 displays the Ecogroup total number of highly vulnerable subwatersheds with the potential for uncharacteristically lethal wildfire (high or extreme uncharacteristic wildfire hazard), and the number and percentage of these subwatersheds with MPCs that would have the most management emphasis for restoring uncharacteristic forest vegetation hazard toward the non-lethal forest vegetation conditions that historically occurred.

Table SW-12. Highly Vulnerable Subwatersheds With Uncharacteristic Lethal High and Extreme Fire Hazard and the Most Management Emphasis for Reducing that Hazard, by Alternative

Area	Highly Vulnerable Subwatersheds with High or Extreme Uncharacteristic Lethal Fire Hazard	Subwatersheds With Management Emphasis for Reducing Hazard						
		Alt 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Ecogroup Total	82	51	50	58	28	72	9	55
Percent With Mgt. Emphasis For Hazard Reduction		62%	61%	71%	34%	88%	11%	67%

Alternative 5 has the most benefit in reducing uncharacteristic wildfire negative effects by emphasizing vegetation restoration treatments on 88 percent of the 82 highly vulnerable, high-risk subwatersheds. This alternative would have the highest likelihood of reducing the extent of wildfire severity on most of the subwatersheds. This restoration would help reduce the size, severity, and intensity of uncharacteristic wildfires, and associated risks and impacts to soil, water, and riparian resources. Alternatives 3, 7, 1B, and 2 would emphasize long-term risk reduction on well over half (71, 67, 62, and 61 percent, respectively) the subwatersheds with uncharacteristically lethal wildfire hazard. Alternatives 4 and 6 would emphasize vegetation restoration treatment on a minor amount (34 and 11 percent, respectively) of the subwatersheds.

Effects on Soil Water and Riparian Resources - Issue 2

Management strategies (prescribed fire or mechanical vegetation treatments) can help reduce the potential for post-wildfire effects and associated BAER costs to highly vulnerable subwatersheds that are at high or extreme risk to uncharacteristically lethal wildfire. The potential for using these types of strategies can be inferred from the MPCs that have been assigned to these subwatersheds by alternative. This MPC determination is based on the availability to use mechanical and or fire management activities to move toward or maintain forest vegetation conditions within their historical range of conditions. Vegetation restoration activities that move vegetation toward historical ranges of variability will provide favorable conditions for soil-hydrologic functions and watersheds processes (ICBEMP 2000a), thereby reducing risks to human life, property, and municipal supply watersheds.

Table SW-13 displays the effects of the alternatives on the highly vulnerable subwatersheds identified with post-wildfire floods and debris flows with potential effects to human life, property, and/or municipal supply watersheds.

Table SW-13. Highly Vulnerable Subwatersheds Considered at Risk to Post-wildfire Floods and Debris Flows that Have Management Emphasis for Reducing Post-wildfire Watershed Risks, by Alternative

Indicator	Alt 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Total highly vulnerable subwatersheds in Ecogroup with high or extreme risk of uncharacteristic lethal wildfire and post-wildfire watershed risks	27	27	27	27	27	27	27
Number of these subwatersheds with MPCs that would emphasize vegetation restoration treatments to reduce risks	21	22	23	14	27	5	23
Percent of subwatersheds with MPC treatment emphasis compared to total Ecogroup subwatersheds at risk	78%	81%	85%	52%	100%	19%	85%

Within the Ecogroup there are 27 highly vulnerable subwatersheds identified with the potential for post-wildfire floods and debris flows that could affect human life, property, and/or municipal supply watersheds. Alternative 5 has MPCs that would emphasize vegetation restoration on all of these subwatersheds, thereby reducing the post-wildfire risks to human life, property, and/or municipal watersheds in all these subwatersheds. Alternatives, 7, 3, 2, and 1B have MPCs that would emphasize vegetation treatments on a relatively high amount of these subwatersheds (85, 85, 81, and 78 percent, respectively). Alternative 4 has MPCs that would emphasize vegetation restoration treatments in a moderate amount (52 percent) of these subwatersheds. Alternative 6 has MPCs that would emphasize vegetation restoration treatments on a small amount (19 percent) of these subwatersheds, resulting in a fairly large number of subwatersheds that would remain at risk to post-wildfire floods and debris flows. Under Alternative 6, over 80 percent of the subwatersheds at risk would continue to pose a threat to human life, property, and/or municipal watersheds from uncharacteristically lethal wildfire.

Effects on Soil Water and Riparian Resources – Issue 3

Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use – This issue is addressed in two parts, below: (1) suited timberland acres, and (2) ERT Acres Compared to Subbasin TOCs.

Suited Timberland Acres – Based on suited timberland acres assigned by MPC, Alternative 5 has the greatest potential for impacts from commercial timber harvest and associated road activities. This alternative is followed in descending order by Alternatives 1B, 2, 3, 7, 6 and 4 (Table SW-14). Suited acres vary considerably by alternative, from an estimated 2,801,563 in Alternative 5 to only 32,940 in Alternative 4. Alternatives that have more acres available for commercial harvest and associated road activities have a higher potential for temporary and short-term impacts to soil productivity, watershed condition, water quality and aquatic habitat. Alternative 5 proposes a substantial increase above the current condition, represented by Alternative 1B. All other alternatives are substantially below Alternative 1B. The new Alternative 7 has approximately 750,000 fewer acres suited timber acres compared to Alternative 1B. Much of this difference occurs within the following subbasins: South Fork Salmon, Upper Salmon, and South Fork Payette.

Table SW-14. Acres of Suited Timber Base within Ecogroup Subbasins, by Alternative

Subbasin	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	104505	29492	57942	0	155744	2360	31779
Boise-Mores	107748	110498	97382	5903	125555	42142	91355
Brownlee Reservoir	71845	68542	72331	0	99843	52434	66763
C J Strike Reservoir	212	213	212	209	218	144	157
Camas Creek	15086	16607	18203	451	24035	3144	4175
Curlew Valley	3266	3335	3266	808	4004	314	821
Goose Creek	18148	15286	15244	4365	20816	1511	14875
Hells Canyon	564	0	0	0	5965	0	564
Lake Walcott	10792	10854	10792	6672	12375	1607	8273
Little Salmon River	55551	45737	39749	0	106844	34799	49374
Little Wood River	7407	6935	6735	0	14167	1394	6735
Lower Boise	2737	3154	2737	6	3587	2246	2737
Lower Middle Fork Salmon	733	0	0	0	12359	0	0
Lower Salmon	14321	4040	15650	0	65907	3705	7965
Middle Fork Payette	85695	76071	69912	0	142349	40328	52532
M. Salmon-Chamberlain	42602	46708	69053	0	89132	10284	18885
Upper Snake-Rock	9329	10521	10446	3442	12842	7608	9433
North Fork Payette	106879	115648	89018	0	164301	60882	88205
North and M. Fork Boise	104294	103624	64427	0	188269	65068	77439
Northern Great Salt Lake	440	468	440	420	556	44	78
Payette	55062	57584	67463	0	80407	45154	53310
Raft River	27338	26107	26006	7452	36257	2724	21037
Salmon Falls Creek	5377	5380	5377	0	6014	3818	5377
South Fork Boise River	172151	178055	168038	3212	263070	62349	106213
South Fork Payette	180187	195491	165692	0	303980	53268	98633
South Fork Salmon	225154	10939	10415	0	393402	2655	20836
Upper Middle Fork Salmon	44360	0	0	0	79965	0	0
Upper Salmon	113446	1021	1018	0	178545	0	1018
Weiser River	165038	164839	162974	0	211055	117228	162721
Totals	**1,750,267**	**1,307,149**	**1,250,522**	**32,940**	**2,801,563**	**617,210**	**1,001,290**

<u>*ERT Acres Compared to Subbasin TOCs*</u> **-** Most alternatives have ERT acres substantially below the TOC for each subbasin after both 20 and 50 years. The shaded boxes in Table SW-15 indicate alternatives and subbasins where the TOC could potentially be exceeded based on MPC modeling assumptions. Actual treatment acres would depend on site-specific proposals, analysis, consultation, and mitigation, which would no doubt modify the numbers presented below.

Table SW-15. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins for the Ecogroup, by Alternative, After 20 and 50 Years

Subbasins Name	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Northern Great Salt Lake	35	30	6	10	0	0	4	40	25	20	30	20	36	33
Curlew Valley	51	42	18	11	6	4	11	38	52	45	38	19	53	41
Lake Walcott	1	4	2	2	2	1	1	28	9	6	8	6	7	11
Raft	21	25	8	11	3	11	18	28	44	29	31	21	27	32
Goose	59	42	20	29	10	6	25	46	78	46	59	30	107	92
Upper Snake-Rock	23	22	16	10	11	6	34	49	23	15	39	19	28	49
Salmon Falls Creek	3	2	83	40	75	40	13	13	4	17	42	38	57	36
Big Wood	9	7	55	36	38	31	16	27	20	19	24	18	66	45
Camas Creek	9	13	11	14	8	7	9	26	15	16	19	18	30	28
Little Wood	6	7	34	32	30	30	13	27	20	21	25	21	53	44
C J Strike Reservoir	10	17	4	11	33	33	5	12	12	13	10	20	6	10
North and M. Fork Boise	38	37	21	28	19	23	18	24	26	31	20	24	34	36
Boise-Mores	36	38	18	31	18	22	18	26	33	37	16	26	26	40
South Fork Boise River	34	24	22	23	18	18	15	23	21	23	19	20	43	36
Lower Boise	68	56	19	29	16	25	36	31	58	48	31	32	24	29
South Fork Payette	64	56	35	34	33	31	31	28	49	47	40	33	62	51
Middle Fork Payette	93	77	41	38	39	34	38	32	76	67	47	37	68	63
Payette	63	58	64	43	48	38	30	22	52	48	46	34	72	58
North Fork Payette	63	57	69	47	46	35	38	26	56	45	50	33	79	56
Weiser River	35	36	25	22	22	18	22	20	30	34	31	26	37	38
Brownlee Reservoir	44	40	27	23	16	15	24	20	32	33	30	25	39	35
Hells Canyon	107	105	45	37	36	26	48	29	90	84	136	67	39	31
Upper Salmon	42	26	119	70	86	49	67	51	43	33	62	39	125	75
Upper Middle Fork Salmon	112	83	61	46	55	37	50	31	61	51	61	38	90	66
Lower Middle Fork Salmon	40	39	36	27	28	16	31	15	48	36	32	21	51	39
Middle Salmon-Chamberlain	61	45	33	30	23	18	32	23	57	44	82	46	46	36
South Fork Salmon	72	56	66	43	44	33	35	25	63	50	52	33	78	53
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41
Little Salmon	58	45	43	30	32	20	29	18	50	38	42	25	44	33

Only the Hells Canyon, Upper Middle Fork Salmon, Upper Salmon and Goose Creek subbasins have ERT acres above the 100 percent TOC in select alternatives (Table SW-15). Many of the higher acre percentages are due to potential management activities to reduce wildfire risks and move forest vegetation toward desired conditions using mechanical and fire treatments. Because modeled ERT values exceed the threshold of concern (100 percent), the potential effects to soil, water, and riparian resources are relatively high in the short term in Hells Canyon for Alternatives 1B and 6, Upper Middle Fork Salmon in Alternative 1B, Upper Salmon in Alternatives 2 and 7, and Goose Creek in Alternative 7. Remaining effects (see Effects Common to All Alternatives, General Effects) to water quality, watershed condition, and flow/hydrology have a higher probability of occurring, depending on the type and intensity of activities that may be allowed under each alternative, based on MPCs. For Alternative 7 the amount of suited timber base acres in these subbasins are relatively low to no suited timber base acres as follows: Upper Salmon, no suited timber base acres; Upper Middle Fork Salmon, no suited timber base acres; Goose Creek, 15,000 suited timber base acres. Most of these affected pathways are also currently "functioning at risk" in the Hells Canyon, Upper Middle Fork Salmon and Upper Salmon subbasins. This suggests some subwatersheds within these subbasins may be more sensitive to the forest vegetation management activities. Forest-wide management direction would greatly reduce any potential negative effects, and potential effects would likely be further reduced through project-level mitigation and consultation.

Issue 3, **Indicator 2: Effects From Livestock Grazing** - This issue is addressed in two parts, below: (1) suitable rangeland acres, and (2) Less Restrictive vs. More Restrictive Grazing Management.

Suitable Rangeland Acres – The percents of suitable rangeland acres are somewhat less under Alternatives 2, 3, 4, 6 and 7 across the Ecogroup, as compared to the current forest plans, represented by Alternative 1B (Table SW-16). Alternative 5 is similar to Alternative 1B. Alternative 7 would have approximately 100,000 acres less suited rangeland acres as compared to Alternative 1B. For all alternatives, suitable rangeland acres are less than 20 percent of the total subbasin within 15 of the 29 subbasins. The Goose Creek, Little Wood River, Northern Great Salt Lake, Salmon Falls Creek, Raft River, and Upper Snake-Rock subbasins have the highest percentages of suitable rangelands for all alternatives.

Table SW-16. Percent of Suited Rangeland within Ecogroup Subbasins, by Alternative

Subbasin	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	20%	20%	20%	19%	20%	4%	20%
Boise-Mores	27%	26%	26%	26%	27%	26%	26%
Brownlee Reservoir	27%	27%	19%	19%	27%	19%	27%
C J Strike Reservoir	9%	9%	9%	9%	9%	9%	9%
Camas Creek	20%	20%	20%	19%	20%	4%	20%
Curlew Valley	6%	6%	6%	6%	6%	6%	6%
Goose Creek	67%	67%	47%	47%	67%	47%	47%
Hells Canyon	12%	12%	4%	4%	12%	0%	2%
Lake Walcott	17%	16%	16%	16%	17%	16%	16%
Little Salmon River	19%	19%	19%	19%	19%	19%	19%
Little Wood River	37%	37%	37%	37%	37%	37%	37%
Lower Boise	7%	7%	7%	7%	7%	7%	7%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Middle Fork Payette	24%	20%	20%	20%	24%	20%	20%
Middle Salmon-Chamberlain	1%	1%	1%	1%	1%	1%	1%
Upper Snake-Rock	76%	76%	44%	44%	76%	38%	44%
North Fork Payette	11%	11%	11%	11%	11%	11%	11%
North and M. Fork Boise	22%	21%	21%	21%	22%	21%	21%
Northern Great Salt Lake	65%	65%	65%	65%	65%	65%	65%
Payette	32%	32%	32%	32%	32%	32%	32%
Raft River	38%	38%	38%	38%	38%	38%	38%

Subbasin	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Salmon Falls Creek	80%	80%	80%	80%	80%	80%	80%
South Fork Boise River	22%	22%	22%	22%	22%	22%	22%
South Fork Payette	7%	4%	4%	4%	7%	4%	4%
South Fork Salmon	2%	2%	2%	2%	2%	2%	2%
Upper Middle Fork Salmon	1%	5%	5%	1%	5%	5%	1%
Upper Salmon	8%	8%	8%	8%	8%	8%	8%
Weiser River	32%	32%	32%	32%	32%	32%	32%

<u>*Less Restrictive vs. More Restrictive Grazing Management*</u> - MPC emphasis and management direction also needs to be considered in addition to suited rangeland acres. Those alternatives and subbasins with a higher amount of suited rangeland acres and MPCs with more restrictive grazing direction have less of a potential for temporary and short term effects to the soil and water quality associated matrix pathways. The combination of less suited rangeland acres and reduced percentages of more restrictive grazing strategies suggest there is a greater chance for temporary effects to soil, water and riparian resources. In particular, the Brownlee Reservoir, Boise-Mores, Middle Fork Payette, North Fork and Middle Fork Boise, Payette, South Fork Boise, Weiser, Little Salmon, Lower Salmon, Raft River, Goose Creek, Upper Snake-Rock, Salmon Falls Creek, and Camas Creek subbasins could have more grazing impacts due to a higher percentage of the suited rangeland acres having less restrictive MPCs (Table SW-17).

Table SW-17. Percent of Less and More Restrictive Grazing Strategies within Ecogroup Subbasins, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Big Wood River	90	10	76	24	76	24	34	76	100	0	35	65	80	20
Boise-Mores	100	0	95	5	87	13	90	10	96	4	96	4	95	5
Brownlee Reservoir	100	0	100	0	99	1	0	100	100	0	100	0	98	2
C J Strike Reservoir	100	0	100	0	100	0	100	0	100	0	100	0	100	0
Camas Creek	100	0	100	0	100	0	61	39	100	0	100	0	100	0
Curlew Valley	100	0	100	0	100	0	23	77	100	0	100	0	23	67
Goose Creek	100	0	94	6	93	7	40	60	100	0	93	7	88	12
Hells Canyon	100	0	99	1	98	2	97	3	100	0	55	45	98	2
Lake Walcott	100	0	100	0	100	0	100	0	100	0	100	0	100	0
Little Salmon River	97	3	88	12	49	51	18	82	84	16	89	11	58	42
Little Wood River	45	55	43	57	43	57	8	92	100	0	46	54	43	57
Lower Boise	100	0	100	0	100	0	100	0	100	0	100	0	100	0
Lower M. Fork Salmon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
Middle Fork Payette	100	0	94	6	94	6	51	49	100	0	100	0	100	0
Middle Salmon-Chamberlain	39	61	100	0	93	7	0	100	100	0	100	0	54	46
Upper Snake-Rock	100	0	100	0	100	0	92	8	100	0	100	0	100	0
North Fork Payette	79	21	78	22	48	52	8	82	100	0	78	22	52	48
N. and M. Fork Boise	83	17	82	18	68	32	13	87	93	7	88	12	78	22

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
N. Great Salt Lake	100	0	100	0	100	0	100	0	100	0	100	0	56	44
Payette	100	0	100	0	100	0	51	49	100	0	100	0	100	0
Raft River	100	0	100	0	100	0	49	51	100	0	96	4	78	22
Salmon Falls Creek	100	0	100	0	100	0	92	8	100	0	100	0	100	0
S. Fork Boise River	100	0	95	5	89	11	29	71	100	0	99	1	94	6
South Fork Payette	76	24	94	6	93	7	27	73	100	0	94	6	89	11
South Fork Salmon	79	21	40	60	1	99	0	100	85	15	62	38	8	92
Upper M. Fork Salmon	88	12	18	82	0	100	0	100	100	0	53	47	0	100
Upper Salmon	78	22	10	90	1	99	16	84	100	0	42	58	1	99
Weiser River	79	21	100	0	100	0	0	100	100	0	100	0	52	48

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Issue 3, **Indicator 3: Appropriate Restoration for 303(d) WQL Water Bodies -** All ACS priority subwatersheds identified by WARS would have a high emphasis for restoration of subwatersheds identified with 303(d) water quality limited water bodies in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis (refer to Effects Methodology section in this Chapter). Alternative 3 has MPCs that emphasize the most appropriate restoration and conservation in 45 percent of the high priority subwatersheds identified by the WARS (Table SW-18). The Alternative 3 percentage is followed in descending order by Alternatives 7, 2, 6, 4, 1B, and 5. Subwatersheds with the appropriate restoration MPC assigned would likely experience a faster rate of recovery. The MPC emphasis would contribute to efforts to restore 303(d) water bodies in support of their beneficial uses, which should eventually assist in their de-listing.

Regardless of the restoration/conservation MPCs and how they were applied, all subwatersheds with listed 303(d) water bodies would receive special emphasis to improve watershed conditions under all alternatives due to the Forest Service's legal obligation to meet requirements under the Clean Water Act. For the action alternatives, this obligation has been addressed by specific Forest-wide and Management Area direction in the revised Forest Plans to restore 303(d) water bodies, and to protect SWRA resources. This direction should help improve water quality and assist in de-listing these water bodies and achieving conditions needed for these subwatersheds to fully support their beneficial uses. It is, therefore, assumed that subwatersheds with 303(d) water bodies that do not have the most appropriate restoration MPC assigned would still recover, but at a slower rate than those that do.

Table SW-18. Percent of Subwatersheds with High Priority 303(d) Water Quality Limited Water Bodies Receiving Most Appropriate Restoration or Conservation Emphasis or Identified as an ACS Priority Subwatershed, by Alternative

303(d) Water Quality Limited Water Bodies	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Ecogroup Total	12%	42%	45%	27%	7%	30%	43%

Issue 3, **Indicator 4: Appropriate Restoration for TMDLs -** Currently there are six subbasins partially or wholly within the Ecogroup with TMDLs approved or waiting approval by the Environmental Protection Agency. All ACS priority subwatersheds with subbasins that have a TMDL assigned would have a high emphasis for restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis (refer to Effects Methodology section in this Chapter). Alternative 3 has MPCs that emphasize the most appropriate restoration and conservation in 32 percent of the high priority subwatersheds identified by the WARS (Table SW-19). The Alternative 3 percentage is followed in descending order by Alternatives 7, 2 and 4, 6, and 1B and 5. Subbasins with the appropriate restoration MPC assigned would likely experience a faster rate of recovery. The MPC emphasis would contribute to efforts to restore TMDL subbasins in support of their beneficial uses, which should eventually assist in their de-listing. Percentages vary considerably by subbasin, as illustrated in Table SW-19.

Table SW-19. Percent of High Priority TMDL Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis or Identified as an ACS Priority Subwatershed within Subbasins Within the Ecogroup, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Lake Walcott	0%	0%	0%	0%	0%	33%	0%
Lower Boise	0%	0%	0%	60%	0%	0%	0%
Middle Fork Payette	0%	17%	17%	17%	8%	17%	17%
Upper Snake-Rock	0%	0%	0%	0%	0%	0%	0%
North Fork Payette (Cascade Rsvr.)	15%	15%	62%	46%	8%	15%	31%
South Fork Salmon	16%	63%	74%	26%	16%	32%	68%
Totals	**7%**	**21%**	**32%**	**21%**	**7%**	**19%**	**25%**

Regardless of the restoration/conservation MPCs and how they were applied, all subbasins with assigned TMDLs would receive special emphasis to improve watershed conditions under all alternatives due to the Forest Service's legal obligation to meet requirements under the Clean Water Act. For the action alternatives, this obligation has been combined with specific Forest-wide and Management Area direction in the revised Forest Plans to restore 303(d) water bodies, and to protect SWRA resources. This direction should help improve water quality and assist in de-listing these TMDLs and achieving conditions needed for these subbasins to fully support their beneficial uses. It is therefore assumed that subbasins with TMDLs that do not have the most appropriate restoration MPC assigned would still recover, but at a slower rate than those that do.

Issue 3, Indicator 5: Effects From Motorized Trail Use - Trails currently open to motorized use would be prohibited within recommended wildernesses under Alternatives 4 and 6.

Under Alternative 4, an estimated 1,316 miles of motorized trail could be affected. The South Fork Salmon and South Fork Boise subbasins both have over 200 miles of motorized trails in recommended wilderness areas. The Big Wood, Little Salmon, Middle Fork Payette, South Fork Payette, and Upper Salmon subbasins have between 80-120 miles of motorized trails. The Brownlee Reservoir, Lower Salmon, North and Middle Fork Boise, North Fork Payette, and Weiser subbasins have between 40-70 miles. Nine other subbasins have minor amounts of motorized trails in recommended wilderness under Alternative 4. Under Alternative 6, an estimated 216 miles of motorized trail in recommended wilderness could be affected. The South Fork Salmon, Upper Salmon, and the South Fork Payette subbasins have between 40-70 miles of motorized trails. Five other subbasins have minor amounts of motorized trails. (Table SW-20).

Table SW-20. Miles of Summer Motorized Trails Within Recommended Wilderness, by Subbasin

Subbasin	Miles of Motorized Trail	
	Alternative 4*	Alternative 6*
Big Wood River	117	0
Brownlee Reservoir	48	0
Camas Creek	11	0
Curlew Valley	3	0
Goose Creek	4	0
Hells Canyon	1	0
Little Salmon River	86	0
Little Wood River	20	7
Lower Salmon	72	0
Middle Fork Payette	93	0
Middle Salmon-Chamberlain	13	<1
North and Middle Fork Boise	64	8
North Fork Payette	58	18
Payette	4	0
Raft River	15	0
South Fork Boise River	216	0
South Fork Payette	107	49
South Fork Salmon	211	66
Upper Middle Fork Salmon	9	4
Upper Salmon	122	64
Weiser River	44	0
Totals	**1,316 miles**	**216 miles**

*Subwatersheds included are either partially or wholly within the Ecogroup

Where these trails are within RCAs in the subbasins noted above, reduced motorized use is likely to reduce sediment delivery and improve streambank stability. These effects would assist in improving soil-hydrologic function, water quality, and riparian functions and ecological processes. Similar benefits would likely occur, although to a slighter extent, in subbasins with lesser amounts of prohibited motorized trail use.

All current motorized trails would remain open under Alternatives 1B, 2, 3, 5, and 7. Effects to aquatic species and SWRA resources would be similar under these Alternatives. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated. Management direction would help to minimize most potential impacts under all alternatives. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use.

Effects on Snake River Sockeye Salmon, An Endangered Species - Issue 4

Direct and Indirect Effects to Sockeye Salmon

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use - This indicator is addressed in two parts, below: (1) suited timberland acres, and (2) ERT Acres Compared to Subbasin TOCs. This applies to all fish species sections that follow.

Suited Timberland Acres – Based on suited timberland acres assigned by MPCs, Alternatives 5 and 1B have the greatest potential (345,943 and 171,102 acres) for impacts from commercial timber harvest and associated road activities (Table SW-21). These alternatives have a higher potential for temporary and short-term impacts to previously identified matrix pathways (water quality, habitat condition, etc.) and to sockeye salmon. The remaining alternatives have no more than 1,018 suited acres (less than 1 percent of the subbasin) within the Sockeye ESU, which means they have a very low potential for timber- and road-related impacts. Alternative 7 would have far fewer (143,234) suited acres than Alternative 1B, no action.

Table SW-21. Acres of Suited Timber Base within Subbasins in the Snake River Sockeye ESU and Migratory Corridors, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Migratory Corridor Only							
Lower Middle Fork Salmon	733	0	0	0	12,359	0	0
Lower Salmon	14,321	4,040	15,650	0	65,907	3,705	7,965
Middle Salmon-Chamberlain	42,602	46,708	69,053	0	89,132	10,284	18,885
Sockeye ESU Only							
Upper Salmon	113,446	1,021	1,018	0	178,545	0	1,018
Migratory and ESU Totals	**171,102**	**51,769**	**85,721**	**0**	**345,943**	**13,989**	**27,868**

Alternatives 3 and 5 would have the greatest potential for impacts from commercial timber harvest and roads to subbasins in the sockeye migratory corridor, followed by Alternatives 1B, 2, and 7 with moderate potential for impacts, and Alternatives 4 and 6 with the lowest potential. Timber-related activities would not be expected to have significant effects to the sockeye migratory corridor under any alternative for several reasons. First, effects would have to be quite large (changes in water quality, excessive sediment that temporary blocks passage, etc.) to disrupt sockeye migration. Management direction (SWRA Standards 1, 4, etc.) would not allow effects of this severity to occur. Second, suited timberland acres for most alternatives represent a very small amount (less than 9 percent) of the lands administered by the Ecogroup Forests within the three migratory subbasins. Thus, impacts from timber-related activities would not be widespread. Only Alternative 5, which represents 19 percent of the Ecogroup area, could have widespread effects. Finally, not all identified suited acres would be treated over the life of each forest plan for many reasons, including funding and personnel constraints, other project priorities, and the probability that portions of the land may not need treatment at this time.

ERT Acres Compared to Subbasin TOCs - Most alternatives, with the exception of 2 and 7, have ERT acres between 42 to 85 percent of the TOC for each subbasin in the first 20 years (Table SW-22). Subbasins with ERT acres less than 100 percent represent a low risk of associated impacts to sockeye and its critical habitat, as the potential impacts from vegetation management actions are assumed to be easily assimilated within each subbasin. Vegetation management and roads have the potential to affect most matrix pathways. Thus, those subbasins with a lower percentage of ERT acres relative to the TOC should have less potential for those effects outlined under the Effects Common to All Alternatives.

Table SW-22. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins in the Snake River Sockeye ESU and Migratory Corridors, by Alternative

Subbasins	ERT Acre Percentage Relative to Threshold of Concern													
	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Migratory Corridor Only														
Lower M. Fork Salmon	40	39	36	27	28	16	31	15	48	36	32	21	51	39
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41
Middle Salmon-Chamberlain	61	45	33	29	24	18	32	23	57	44	82	46	46	36
Sockeye ESU Only														
Upper Salmon	42	26	120	70	85	50	69	52	42	36	62	38	125	75

Alternatives 2 and 7 have ERT percents after 20 years of 120 and 125, respectively. They would pose a higher risk in the short term to sockeye and its habitat from forest vegetation management. These relatively high percentages occur because the Upper Salmon subbasin is a high priority for reducing wildfire risks to wildland urban interfaces using fire and mechanical thinning. Much of the projected treatments would occur outside of occupied sockeye subwatersheds, with the exception of Redfish Lake. Impacts (see Effects Common to all Alternatives) to water quality, watershed condition, and flow/hydrology could occur depending on the intensity of activities proposed. Each of these affected pathways are also currently "functioning at risk" for the Upper Salmon subbasin (see Environmental Baseline). This suggests some subwatersheds may be more sensitive to proposed management actions. Alternatives that would have the highest ERT percentages over the short term (20 years) in this subbasin are, in descending order: 7, 2, 3, 4, 6, 5 and 1B. Over the long term (50 years), the highest percentages would occur, in descending order for Alternatives 7, 2, 4, 3, 6, 5, and 1B; however no alternative would exceed the subbasin TOC.

None of the subbasins with a sockeye migratory corridor has ERT acres above the TOC in the first 20 years. Thus, the potential impacts from timber-related activities would be expected to be low to the migratory corridors and would be easily assimilated within each subbasin.

Issue 4, **Indicator 2: Effects From Livestock Grazing** - This indicator is addressed in two parts, below: (1) suitable rangeland acres, and (2) Less Restrictive vs. More Restrictive Grazing Management. This applies to all fish species sections that follow.

Suitable Rangeland Acres - Suitable rangeland acres are the same for all alternatives, 41,367 acres, or 8 percent of the Ecogroup area in the Upper Salmon subbasin and ESU (Table SW-23). Suitable rangeland acres would also remain the same for all subbasins that include a sockeye migratory corridor. Suitable rangeland acres are absent in the Lower Middle Fork Salmon subbasin, and comprise only 1 percent of the Middle Salmon Chamberlain subbasin. The Lower Salmon subbasin consistently has a higher potential for grazing impacts due to a higher amount of suitable rangeland acres (19 percent).

Table SW-23. Percent of Suitable Rangeland within Subbasins in the Snake River Sockeye ESU and Migratory Corridors, by Alternative

Subbasin	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Migratory Corridor Only							
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Middle Salmon-Chamberlain	1%	1%	1%	1%	1%	1%	1%
Sockeye ESU Only							
Upper Salmon	8%	8%	8%	8%	8%	8%	8%
Migratory and ESU Totals	**12%**	**12%**	**12%**	**12%**	**12%**	**12%**	**12%**

Less Restrictive vs. More Restrictive Grazing Management **-** MPC emphasis and management direction also needs to be considered in addition to suited rangeland acres. Those alternatives and subbasins with a higher amount of suited rangeland acres and MPCs with less restrictive grazing management have a greater potential for temporary and short-term effects to matrix pathways. In the Lower Salmon subbasin, suitable rangeland acres in Alternatives 1B, 2, 5, and 6 could have more effects, due to less restrictive grazing strategies, than Alternatives 3, 4, and 7, which have more restrictive strategies (Table SW-24). Strategies could also have indirect effects (increased turbidity, sediment, nutrients, etc.) to the sockeye migration corridor because allotments occur upstream of the Salmon River.

Table SW-24. Percent of Less and More Restrictive Grazing Strategies within Subbasins in the Snake River Sockeye ESU and Migratory Corridors, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Migratory Corridor Only														
Lower Middle Fork Salmon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
M. Salmon-Chamberlain	100	0	100	0	93	7	0	100	100	0	100	0	2	98
Sockeye ESU Only														
Upper Salmon	78	22	10	90	1	99	16	84	100	0	42	58	1	99
Migratory & ESU Totals	**81**	**19**	**32**	**68**	**11**	**89**	**11**	**89**	**99**	**1**	**59**	**41**	**7**	**93**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Overall, grazing management would be more restrictive on a significant percentage of the migratory and ESU subbasins in Alternatives 2, 3, 4, and 7, with a 19 to 68 percent increase over Alternative 1B (Table SW-24). Although the amount of suitable acres would not change, the change in management direction would help to reduce threats and achieve TEPC fish and SWRA resource objectives when compared to the current plans, represented by Alternative 1B.

For the Alternative 7, grazing management would change significantly from the current forest plans, with 99 percent under more restrictive grazing strategies in the Sockeye ESU (Table SW-24). Grazing would be managed under more restrictive direction to meet the objectives for TEPC fish and SWRA resources. As a result of the low overall acres of suitable rangelands and more restrictive grazing strategies, potential grazing risks to sockeye would be low for Alternatives 2, 3, 4, and 7. Risks would be slightly higher, with more potential localized impacts, under the other alternatives due to the less restrictive grazing strategies.

Issue 4, **Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard** - There are no subwatersheds identified at high risk from uncharacteristic wildfires in the Ecogroup portion of the Upper Salmon subbasin. Migratory corridors along the Salmon River are also not at high risk because only a few subwatersheds, far upstream of the Salmon River, are at high risk.

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis** - Because sockeye have critically low population numbers and habitat is at some risk, passive restoration was determined to be the most appropriate restoration to improve habitat over the short term, while minimizing management impacts. It was assumed that MPCs that provide the most passive restoration of sockeye habitat would do the best job of both maintaining population levels in the short term, while making both short-term and long-term improvements to sockeye habitat.

All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. Alternatives 3, 2, 7, and 6 have MPCs that emphasize the most appropriate restoration or conservation in 85, 78, 73, and 58 percent of the high priority subwatersheds, respectively, identified by the WARS in the Upper Salmon subbasin (Table SW-25). This restoration emphasis, coupled with management direction, should make great strides in reducing existing effects and improving watershed and habitat conditions.

Table SW-25. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Sockeye ESU and Migration Corridors, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Migratory Corridor Only							
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Middle Salmon-Chamberlain	56%	56%	49%	61%	49%	59%	61%
Sockeye ESU Only							
Upper Salmon	18%	78%	85%	18%	15%	58%	73%
Migratory and ESU Totals	50%	74%	72%	52%	43%	65%	72%

Alternatives 1B, 4, and 5 have MPCs that emphasize the appropriate restoration and conservation in only 18, 18, and 13 percent, respectively, of the high priority subwatersheds identified by WARS within the Upper Salmon subbasin. Some subwatersheds, not receiving the appropriate restoration emphasis, fall within ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or slowly trend toward recovery. However other subwatersheds that do not fall within ACS priority subwatersheds may not have restoration applied in the short term. Localized effects to water quality, channel condition, watershed condition, and flow/hydrology pathways may continue to occur where problem sites are not addressed in the short term. These effects could place already depressed sockeye subpopulations at greater risk in portions of each subbasin.

There are 38 subwatersheds (in the Lower Salmon, Lower Middle Fork Salmon, Middle Salmon-Chamberlain, and Upper Salmon subbasins) with migration corridors for sockeye along the Salmon River that could be affected by aquatic restoration. Most alternatives, with the exception of Alternative 5, have MPCs that emphasize the appropriate restoration for high priority subwatersheds identified by the WARS in the sockeye migration corridor. Restoration of these adjacent subwatersheds would be expected to provide an indirect benefit to sockeye by helping to restore water quality (temperature, sediment, etc.) in the main stem Salmon River.

Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations **-** There are no stronghold sockeye subpopulations in the Upper Salmon subbasin, so there would be no potential effects to this indicator under any alternative.

Four subwatersheds in the Upper Salmon subbasin are occupied for spawning and rearing by depressed sockeye subpopulations. Alternatives 2, 3, 6 and 7 have MPCs that emphasize the appropriate restoration recommended by the WARS in all the subwatersheds containing depressed sockeye subpopulations (Table SW-26). These alternatives have the potential to improve habitat and watershed conditions in all of the depressed sockeye subpopulations. Alternatives 1B, 4, and 5 have the potential to improve habitat and watershed conditions in 75 percent of the subwatersheds with depressed sockeye subpopulations.

Table SW-26. Percent of Depressed Sockeye Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Sockeye ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Upper Salmon	75%	100%	100%	75%	75%	100%	100%

Issue 4, Indicator 5: Effects From Motorized Trail Use - Trails currently open to motorized use would be prohibited within recommended wildernesses under Alternatives 4 and 6. The Upper Salmon subbasin would have the least potential impacts from motorized trail use under these alternatives. Trail restrictions could result in more concentrated use on remaining motorized trails, a few of which are in subwatersheds occupied by sockeye. Subwatersheds with more motorized trails in RCAs potentially could also see more impacts to sockeye and their habitat. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use.

All motorized trails would remain open under the remaining alternatives. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects to Sockeye Salmon

Non-federal actions are likely to continue affecting listed species. Effects to sockeye salmon from non-federal lands would be low overall in the Salmon River Basin when compared to other areas in the Ecogroup Forests. Non-federal lands comprise only 13 percent of the sockeye ESU. However, effects to sockeye habitat from non-federal lands would be expected along the mainstream Salmon River and lower-elevation, valley bottoms in the ESU. As described in the Cumulative Effects Common to all Alternatives section, non-federal actions and a degraded baseline would continue to stress populations.

The level of risk associated with cumulative effects was evaluated for sockeye in the Upper Salmon subbasin and migratory corridor. Alternative 3 would have a slightly lower combined risk from cumulative effects than all other alternatives, which would have the same risk of cumulative effects (Table SW-27). The Lower Salmon could see a slightly higher risk of cumulative effects under Alternatives 1B, 2, 5, and 6 due primarily to more grazing with less restrictive management direction, combined with degraded baselines.

Table SW-27. Relative Risks* from Cumulative Effects within the Ecogroup Portion of the Snake River Sockeye ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Migratory Corridor Only							
Lower Middle Fork Salmon	6	6	6	6	6	6	6
Lower Salmon	10	10	9	9	11	10	9
Middle Salmon-Chamberlain	7	7	7	7	7	7	7
Sockeye ESU Only							
Upper Salmon	8	8	6	8	8	7	8
Migratory and ESU Totals	8	8	7	8	8	8	8

***** Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Sockeye Salmon

A viability analysis was not run for sockeye salmon because the analyses for spring/summer chinook salmon, steelhead, and bull trout were thought to adequately represent potential watershed condition changes for this species. Chinook, steelhead, and bull trout populations are all predicted to improve in 50 years under all alternatives because of the greater restoration emphasis and continued adjustments to grazing and recreation activities. Sockeye habitat would also be expected to improve.

How much sockeye populations respond to this habitat improvement, however, is dependent on downstream influences in the Salmon River and Columbia River Basins. Additional high quality habitat alone is no guarantee of increased persistence without a comprehensive approach that addresses all mortality factors acting upon the population, including those outside the Ecogroup Forests' jurisdiction (ICBEMP 1997a).

Effects on Snake River Spring/Summer Chinook Salmon, A Threatened Species -Issue 4

Direct and Indirect Effects to Spring/Summer Chinook Salmon

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use

<u>*Suited Timberland Acres*</u> – Based on suited timberland acres assigned by MPCs, Alternatives 1B and 5 have the greatest potential (496,731 and 932,119 acres) for impacts from commercial timber harvest and associated road activities. Alternatives 2, 3, and 7 would have a moderate potential, and Alternatives 4 and 6 would have a low potential for impacts from timber harvest and associated road activities (Table SW-28). In particular, the South Fork Salmon and Little Salmon subbasins, which contain chinook stronghold subwatersheds, could see a greater risk of impacts under Alternatives 1B and 5 than other alternatives that propose far less suited timberland acres. Alternative 7 would have far less suited timber base than Alternative 1B, with the greatest differences occurring in the Upper Salmon, South Fork Salmon, and Lower and Upper Middle Forks of the Salmon River subbasins.

Table SW-28. Acres of Suited Timber Base within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	564	0	0	0	5,965	0	564
Little Salmon River	55,551	45,737	39,749	0	106,844	34799	49,374
Lower Middle Fork Salmon	733	0	0	0	12,359	0	0
Lower Salmon	14,321	4,040	15,650	0	65,907	3705	7,965
Middle Salmon-Chamberlain	42,602	46,708	69,053	0	89,132	10284	18,885
South Fork Salmon	225,154	10,939	10,415	0	393,402	2655	20,836
Upper Middle Fork Salmon	44,360	0	0	0	79,965	0	0
Upper Salmon	113,446	1,021	1,018	0	178,545	0	1,018
Entire ESU	496,731	108,445	135,885	0	932,119	51,443	98,642

<u>*ERT Acres Compared to Subbasin TOCs*</u> **-** Most alternatives have ERT acres between 24 to 90 percent of the TOC for each subbasin in the first 20 years (Table SW-2). Shaded boxes in the table indicate alternatives and subbasins where the TOC could be exceeded based on MPC modeling assumptions. Actual treatment acres would depend on site-specific proposals, analysis, consultation, and mitigation, which would no doubt modify the numbers presented below.

Table SW-29. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins in the Spring/Summer Chinook ESU, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Hells Canyon	107	106	45	37	36	26	48	29	90	84	136	67	39	31
Little Salmon River	58	45	43	30	32	20	29	18	51	38	42	26	44	33
Lower M. F. Salmon	40	39	36	27	28	16	31	15	48	36	32	21	51	39
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41
Middle Salmon-Chamberlain	61	45	33	29	24	18	32	23	57	44	82	46	46	36
South Fork Salmon	72	56	66	43	44	33	35	25	63	50	52	33	78	53
Upper M. F. Salmon	112	90	61	46	55	37	50	31	61	51	61	38	90	66
Upper Salmon	42	26	120	70	85	50	69	52	42	36	62	38	125	75

Only the Hells Canyon, Upper Middle Fork Salmon and Upper Salmon River subbasins have ERT acres above the 100 percent TOC in select alternatives (Table SW-29). Many of the higher acre percentages are due to potential management activities to reduce wildfire risks and move vegetation toward desired conditions using fire reintroduction and mechanical thinning. Because the modeled ERT value exceeds the threshold of concern, the potential effects to chinook salmon and critical habitat would be high in the short term in Upper Middle Fork Salmon in Alternative 1B, and Upper Salmon in Alternatives 2 and 7. Although ERT values exceed the threshold of concern under Alternatives 1B and 6 in Hells Canyon, lands managed by the Ecogroup comprise only 3 percent of the subbasin. Therefore any impacts are expected to be localized and pose little risk to chinook. Remaining effects (see Effects Common to All Alternatives, General Effects) to water quality, watershed condition, and flow/hydrology could occur depending on the intensity of activities proposed in each alternative. Most of these affected pathways are also currently "functioning at risk" for the Upper Middle Fork Salmon and Upper Salmon subbasins. This suggests some subwatersheds may be more sensitive to proposed management actions.

Issue 4, Indicator 2: Effects From Livestock Grazing

Suitable Rangeland Acres – Suitable rangeland acres are slightly less under Alternatives 3, 4, 6 and 7 in the spring/summer chinook ESU from the current forest plans, represented by Alternative 1B (Table SW-30). Alternatives 2 and 5 are the same as 1B, or 6 percent suitable rangeland acres across the ESU. Suitable rangeland acres are less than 10 percent in the majority of subbasins in the ESU. Only the Little and Lower Salmon subbasins consistently have a higher potential for grazing impacts due to a higher amount of suitable acres (19 percent). Hells Canyon would also have potential for more impacts under Alternatives 1B, 2, and 5 (12 percent).

Table SW-30. Percent of Suitable Rangeland within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	12%	12%	4%	4%	12%	0%	2%
Little Salmon River	19%	19%	19%	19%	19%	19%	19%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Middle Salmon-Chamberlain	1%	1%	1%	1%	1%	1%	1%
South Fork Salmon	2%	2%	2%	2%	2%	2%	2%
Upper Middle Fork Salmon	1%	5%	5%	1%	5%	5%	1%
Upper Salmon	8%	8%	8%	8%	8%	8%	8%
Entire ESU	**6%**	**6%**	**5%**	**4%**	**6%**	**5%**	**4%**

Less Restrictive vs. More Restrictive Grazing Management - MPC emphasis and management direction also needs to be considered in addition to suited rangeland acres. Those alternatives and subbasins with a higher amount of suited rangeland acres and MPCs with less restrictive grazing direction have a greater potential for temporary and short-term effects to matrix pathways. In the Lower Salmon subbasin, Alternatives 1B, 2, 5, and 6 could allow more potential grazing impacts because they have less restrictive grazing strategies than Alternatives 3, 4, and 7 (Table SW-31). In the Little Salmon subbasin, Alternatives 1B, 2, 5, 6, and 7 could have more impacts due to a higher percentage of less restrictive grazing strategies than Alternatives 3 and 4.

Most matrix pathways in the Little Salmon subbasin are currently "functioning at risk" (refer to Environmental Baseline in Current Conditions). This suggests that this subbasin may be more sensitive to grazing activities and effects. Alternatives that would have the most restrictive grazing strategies in this subbasin are, in descending order: 4, 3, 7, 5, 2, 6, and 1B.

Table SW-31. Percent of Less and More Restrictive Grazing Strategies within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Hells Canyon	100	0	99	1	98	2	97	3	100	0	55	45	98	2
Little Salmon River	97	3	88	12	49	51	18	82	84	16	89	11	58	42
Lower M. F. Salmon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
Middle Salmon-Chamberlain	100	0	100	0	93	7	0	100	100	0	100	0	2	98
South Fork Salmon	79	21	40	60	1	99	0	100	85	15	62	38	8	92
Upper M. F. Salmon	88	12	18	82	0	100	0	100	100	0	53	47	0	100
Upper Salmon	78	22	10	90	1	99	16	84	100	0	42	58	1	99
Entire ESU	**85**	**15**	**47**	**53**	**17**	**83**	**12**	**88**	**93**	**7**	**66**	**34**	**23**	**77**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Overall, grazing management strategies would change significantly from the current forest plans in Alternatives 2, 3, 4, and 7, from 15 percent to 53 percent or more with more restrictive grazing strategies. The Lower Salmon, South Fork Salmon, Upper Middle Fork Salmon, Middle Salmon-Chamberlain, and Upper Salmon subbasins would see the greatest change in MPC grazing strategies from the current forest plans, represented by Alternative 1B. The change in management strategies would help reduce threats and achieve TEPC fish and SWRA resource objectives. In the Hells Canyon, Lower Middle Fork Salmon, and Middle Salmon-Chamberlain subbasins, the effects from grazing to chinook salmon and their habitat would be low due to the low suitable rangeland acres.

Issue 4, **Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard**
Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations – Upper Salmon and Upper Middle Fork Salmon subbasins do not have high-risk subwatersheds and are therefore absent from the tables below. The other six ESU subbasins with chinook salmon have subwatersheds at high risk from uncharacteristic wildfire. In these subbasins there are 46 subwatersheds with depressed chinook populations at high risk (Table SW-32). Each alternative assigns MPCs that aggressively treat vegetation to reduce fuel loading. Alternatives 3 and 5 have the most aggressive MPCs, potentially treating more than 50 percent of all subwatersheds where depressed chinook subpopulations occur within the Ecogroup across the ESU. In some subbasins, under these alternatives, all subwatersheds with depressed populations could see treatment. Alternatives 1B, 2, and 7 potentially could treat 38 to 45 percent of the depressed chinook subpopulations within the Ecogroup portions of the ESU. Alternatives 4 (5 percent) and 6 (13 percent) would treat the least amount of subwatersheds with depressed subpopulations.

Table SW-32. Percent of Depressed Chinook Subwatersheds Where Risks from Uncharacteristic Wildfires Could be Reduced within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	100%	100%	100%	100%	0%	100%
Little Salmon River	25%	50%	100%	0%	100%	50%	75%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	75%	75%	100%	0%	100%	25%	50%
Middle Salmon-Chamberlain	50%	50%	67%	0%	67%	17%	50%
South Fork Salmon	46%	25%	33%	4%	71%	4%	38%
Entire ESU	**45%**	**38%**	**53%**	**5%**	**75%**	**13%**	**45%**

Risks from uncharacteristic wildfires to depressed chinook subpopulations would remain high for whose alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high risk from uncharacteristic wildfire subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires would remain high across 88 to 95 percent of the depressed chinook subpopulations within the Ecogroup area and ESU under Alternatives 4 and 6 due to the lack of potential treatments (Table SW-33). These alternatives would be followed by Alternatives 1B, 2, 3, and 7, with 48 to 63 percent of the depressed chinook subpopulations still having a high risk from uncharacteristic wildfires, and Alternative 5 with 25 percent still having a high risk from uncharacteristic wildfires.

Table SW-33. Percent of Depressed Chinook Subwatersheds Where Risks from Uncharacteristic Wildfires Would Remain High within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	100%	0%	0%	0%	0%	100%	0%
Little Salmon River	75%	50%	0%	100%	0%	50%	25%
Lower Middle Fork Salmon	100%	100%	100%	100%	100%	100%	100%
Lower Salmon	25%	25%	0%	100%	0%	75%	50%
Middle Salmon-Chamberlain	50%	50%	33%	100%	33%	83%	50%
South Fork Salmon	54%	75%	67%	96%	29%	96%	62%
Entire ESU	**55%**	**63%**	**48%**	**95%**	**25%**	**88%**	**55%**

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations **-** There are nine subwatersheds considered as strongholds for spring/summer chinook salmon in the Ecogroup area and ESU (Table SW-34). Six of the chinook subpopulations are at high risk from uncharacteristic wildfires (Little Salmon River and South Fork Salmon subbasins). Based on MPC emphasis, treatments to reduce uncharacteristic wildfire risks in two chinook strongholds in the Little Salmon subbasin could vary by alternative. All (100 percent) of the strongholds could be treated under Alternatives 3 and 5; one third could be treated under

Alternatives 2 and 6; and no strongholds would be treated under Alternatives 1B, 4 and 7. In the South Fork Salmon subbasin, all of the strongholds could be treated under Alternative 7; two thirds could be treated under Alternatives 1B, 2, 3, and 5; and one third could be treated under Alternative 6.

Table SW-34. Percent of Strong Chinook Subwatersheds Where Risks from Management Treatments for Uncharacteristic Wildfires Would be Higher within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	0%	33%	100%	0%	100%	33%	0%
South Fork Salmon	67%	67%	67%	0%	67%	33%	100%
Entire ESU	**67%**	**67%**	**67%**	**0%**	**67%**	**33%**	**100%**

*The other subbasins in this ESU do not have any chinook stronghold subwatersheds.

Because high emphasis treatments occur in some of the last remaining strongholds, management activities in the Little Salmon and South Fork Salmon may pose a greater risk to spring/summer chinook than if an uncharacteristic wildfire occurred for all alternatives. Management direction for the action alternatives would help to minimize many potential management effects (see Effects Common To All Alternatives). However, there would still be some risk of impacts to stronghold subwatersheds in each alternative from roads and vegetation treatments.

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis** - All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. Alternatives 2, 3, 7, and 6 have MPCs that emphasize the most appropriate restoration and conservation in 71, 70, 68, and 58 percent, respectively, of the high priority subwatersheds identified by the WARS (Table SW-35).

Table SW-35. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
Little Salmon River	42%	75%	67%	50%	17%	67%	42%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Middle Salmon-Chamberlain	56%	56%	49%	61%	49%	59%	61%
South Fork Salmon	30%	64%	66%	34%	25%	43%	67%
Upper Middle Fork Salmon	18%	82%	82%	82%	18%	82%	73%
Upper Salmon	18%	78%	85%	18%	15%	58%	73%
Entire ESU	**43%**	**71%**	**70%**	**47%**	**34%**	**58%**	**68%**

Under these alternatives, the Upper Salmon, South Fork Salmon, Lower Middle Fork Salmon and Upper Middle Fork Salmon have the potential for a faster rate of aquatic restoration, given their MPCs and number of ACS priority subwatersheds. This restoration emphasis, coupled with more restrictive management direction, should make great strides in reducing existing impacts and improving watershed/habitat conditions. Effects from roads, degraded riparian, poor habitat access, and unstable stream channels should decrease as restoration is implemented. Restoration would slowly reduce the number of water quality limited streams and damaged stream segments identified in the environmental baselines. It would also indirectly benefit chinook by helping to restore subwatersheds that influence migratory corridors.

Not all subbasins under Alternatives 2, 3, 6, and 7, however, have MPCs with the same restoration emphasis as WARS. In the Lower Salmon and Little Salmon subbasins, less than half of the high priority subwatersheds would have the appropriate restoration MPC recommended by the WARS under Alternative 7. While, for the Lower Salmon subbasin, less than half of the high priority subwatersheds would have the appropriate restoration MPC under Alternative 3. Many of these areas, however, fall within ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or trend toward recovery. Yet, some areas that do not fall within ACS priority subwatersheds may continue to see localized effects to water quality, channel condition, watershed condition, and flow/ hydrology pathways where problem sites are not addressed in the short term.

In contrast, Alternatives 1B, 4, and 5 have MPCs that emphasize the appropriate restoration and conservation in little more than a third (34 to 44 percent) of the high priority subwatersheds identified by WARS in the Ecogroup in the ESU. Under these alternatives, the Lower Middle Fork Salmon and Middle Salmon-Chamberlain subbasins have the potential for prioritized aquatic restoration. Again, some areas that do not fall within ACS priority subwatersheds may continue to see localized effects to water quality, channel condition, watershed condition, and flow/hydrology pathways where problem sites are not addressed in the short term.

Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations **-** Alternatives 2, 3, 6 and 7 have MPCs that emphasize the appropriate restoration and conservation recommended by the WARS to more subwatersheds containing stronghold and depressed chinook subpopulations (Tables SW-36 and SW-37) than other alternatives. These alternatives have the potential to improve habitat and watershed conditions in 70 percent or more of the stronghold chinook subpopulations and 59 percent or more of the depressed chinook subpopulations. Most subbasins in the Ecogroup area with chinook subpopulations would see improved habitat and watershed conditions as restoration is implemented. In contrast, Alternatives 1B, 4, and 5 have the potential to improve habitat and watershed conditions in only 50 percent or less of the subbasins with stronghold chinook subpopulations, and 47 percent or less of the subbasins with depressed chinook subpopulations.

Table SW-36. Percent of Chinook Strongholds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins* in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	50%	75%	100%	50%	0%	75%	50%
South Fork Salmon	0%	67%	67%	0%	0%	33%	67%
Upper Middle Fork Salmon	67%	100%	100%	100%	0%	100%	100%
Entire ESU	**40%**	**80%**	**90%**	**50%**	**0%**	**70%**	**70%**

*The other subbasins in this ESU do not have chinook stronghold populations.

Table SW-37. Percent of Depressed Chinook Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
Little Salmon River	33%	67%	33%	33%	0%	67%	33%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	33%	67%	33%	33%	0%	33%	33%
Middle Salmon-Chamberlain	61%	61%	56%	64%	56%	64%	61%
South Fork Salmon	31%	64%	66%	36%	27%	44%	67%
Upper Middle Fork Salmon	38%	75%	75%	75%	25%	75%	63%
Upper Salmon	17%	78%	86%	17%	14%	58%	75%
Entire ESU	**43%**	**71%**	**69%**	**47%**	**37%**	**59%**	**69%**

Issue 4, Indicator 5: Effects From Motorized Trail Use - Trails currently open to motorized use would be prohibited within recommended wildernesses under Alternatives 4 and 6. Under Alternative 4, the South Fork Salmon, Little Salmon, Lower Salmon, and Upper Salmon subbasins would see the most restrictions on motorized use in recommended wilderness. Under Alternative 6, the South Fork Salmon and Upper Salmon would see the most restrictions. All motorized trails would remain open under remaining alternatives. Trail restrictions in these subbasins could result in more concentrated use on remaining motorized trails. Subbasins with more motorized trails in RCAs potentially could also see more impacts to chinook salmon and their habitat. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects on Spring/Summer Chinook Salmon

Non-federal actions are likely to continue affecting listed species. Effects to spring/summer chinook from non-federal lands would be low overall in the Salmon River Basin when compared to other areas in the Ecogroup. Non-federal lands comprise only 10 percent of the Salmon River Basin. However, cumulative effects from non-federal lands would be high in individual subbasins such as the Lemhi, Little Salmon and Lower Salmon. As described in the Cumulative Effects

Common to all Alternatives, degradation and loss of habitat from non-federal actions would continue. Degraded baseline conditions and threats from hatchery fish also would continue to stress populations in most subbasins.

The level of risk associated with cumulative effects was evaluated for each subbasin in the spring/summer chinook ESU within the Ecogroup. Alternatives 1B and 5 would have a slightly higher risk of cumulative effects based on greater timber, grazing, etc. management and less aquatic restoration, than the other alternatives (Table SW-38). In particular, the Little Salmon, Lower Salmon, and South Fork Salmon could see more cumulative effects under these alternatives. Alternative 6 has slightly lower risk of cumulative effects than Alternatives 1B and 5. However, several subbasins still have a high risk of cumulative effects, specifically due to MPCs emphasizing less aquatic restoration and more vegetation management in Hells Canyon, more grazing with less restrictive management direction in Lower Salmon, and potential treatments to reduce fire risk in chinook strongholds in the South Fork Salmon, combined with degraded baselines. Under the Alternative 7, only the Little Salmon subbasin faces greater risk from cumulative effects due to more grazing with less restrictive management direction.

Table SW-38. Relative Risks* from Cumulative Effects within the Ecogroup Portion of the Snake River Spring/Summer Chinook Salmon ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	10	8	8	8	8	10	8
Little Salmon River	10	9	8	9	11	9	10
Lower Middle Fork Salmon	6	6	6	6	6	6	6
Lower Salmon	10	10	9	9	11	10	9
Middle Salmon-Chamberlain	7	7	7	7	7	7	7
South Fork Salmon	10	10	10	10	10	10	9
Upper Middle Fork Salmon	10	6	6	6	8	6	6
Upper Salmon	8	8	6	8	8	7	8
Entire ESU	**9**	**8**	**8**	**8**	**9**	**8**	**8**

***** Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Spring/Summer Chinook Salmon

Projected trends for spring/summer chinook salmon over the first 15 years show that the number of stronghold subpopulations would remain unchanged. This is because it will take time for subpopulations to respond to restoration and passive/conservation measures. The number of depressed subpopulations would change slightly (Table SW-39) for those alternatives that have active restoration MPCs within currently absent, but "linked" subwatersheds. It is assumed in these subwatersheds that fish habitat functioning at unacceptable risk is due to poor Geomorphic and/or Water Quality Integrity. Active restoration could begin to improve these limiting factors in 15 years so that fish could re-colonize from adjacent areas. Large numbers of fish would not be expected to re-colonize each subwatershed initially. Thus, these recolonized subwatersheds would at first be depressed, increasing the number of depressed subpopulations in the first 15 years. Restoration again would not improve enough of the overall subwatershed condition to trend existing depressed populations to strong ones in 15 years.

Table SW-39. Number of Stronghold and Depressed Spring/Summer Chinook Subwatersheds at 15 Years within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Hells Canyon	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3
Little Salmon River	4	10	4	10	4	13	4	13	4	11	4	11	4	12	4	10
Lower M.F. Salmon	0	28	0	28	0	28	0	28	0	28	0	28	0	28	0	28
Lower Salmon	0	9	0	9	0	9	0	9	0	9	0	9	0	9	0	9
Middle Salmon-Chamberlain	0	44	0	44	0	44	0	44	0	44	0	44	0	44	0	44
South Fork Salmon	3	67	3	67	3	67	3	67	3	67	3	67	3	67	3	67
Upper M.F. Salmon	3	12	3	12	3	12	3	12	3	12	3	12	3	12	3	12
Upper Salmon	0	44	0	44	0	46	0	48	0	44	0	44	0	45	0	46
Totals	**10**	**217**	**10**	**217**	**10**	**222**	**10**	**224**	**10**	**218**	**10**	**218**	**10**	**220**	**10**	**219**

S = Stronghold Subpopulations; D = Depressed Subpopulations

Projected trends over the long term indicate a positive trend from current conditions for stronghold subpopulations under all alternatives. These predictions are based upon populations responding favorably to active and passive restoration and conservation measures. However, these predictions do not reflect changes in migration corridor survival from downstream influences in the Columbia River Basin, non-native species, harvest trends, etc. It is assumed that the temporary and short-term effects from Ecogroup activities would not compromise the benefits of restoration and conservation due to new and existing management direction. Alternatives 3, 2, 7, and 6 show the greatest increase in the number of stronghold subpopulations due to having more MPCs that emphasize the appropriate restoration and conservation within high priority subwatersheds identified by the WARS (Table SW-40).

Table SW-40. Number of Stronghold and Depressed Spring/Summer Chinook Subwatersheds at 50 Years within Subbasins in the Snake River Spring/Summer Chinook ESU, by Alternative

Subbasins	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Hells Canyon	0	3	0	3	1	2	0	3	2	1	0	3	0	3	0	3
Little Salmon River	4	10	6	8	11	6	9	8	7	8	5	10	10	6	6	9
Lower M.F. Salmon	0	28	26	2	27	1	27	1	26	2	25	3	26	2	27	1
Lower Salmon	0	9	2	7	4	5	2	7	2	7	0	9	2	7	2	7
Middle Salmon-Chamberlain	0	44	24	20	24	20	22	22	25	19	22	22	25	19	24	20
South Fork Salmon	3	67	23	47	47	23	48	22	27	43	21	49	33	37	49	20
Upper M.F. Salmon	3	12	6	9	9	6	9	6	10	5	5	10	10	5	9	6
Upper Salmon	0	44	5	39	32	14	39	9	5	39	4	40	23	22	31	15
Totals	**10**	**217**	**92**	**135**	**155**	**77**	**156**	**78**	**104**	**124**	**82**	**146**	**129**	**101**	**148**	**81**

S = Stronghold Subpopulations; D = Depressed Subpopulations

In 50 years, under these alternatives, chinook populations are predicted to improve from 10 strong subpopulation subwatersheds up to a range of 82 (Alt. 5) to 156 (Alt. 3). Some of the largest increases would occur in the Upper Salmon, Upper and Lower Middle Forks of the Salmon River, and Middle Salmon-Chamberlain subbasins under these alternatives. Alternative 4 would have a moderate increase from 10 to 104 stronghold subwatersheds, and Alternatives 1B (92) and 5 (82) would have the smallest increase in stronghold subwatersheds.

The predicted increase in strongholds is a result of the greater restoration emphasis, adjustments to grazing and vegetation management, and protection provided by management direction for all action alternatives. As more subwatersheds support strong subpopulations, population risks should decrease. In particular, restoration should improve density dependent (e.g., sex ratios, etc.) and genetic diversity factors. Many of the remaining strongholds for chinook are clustered in a few subwatersheds in two or three subbasins and are at high risk from disturbances. Stronger populations should result in more dispersed and resilient metapopulations across each subbasin, reducing the risks from uncharacteristic disturbance events. Restoration and conservation should also increase the availability of high quality habitats, thereby decreasing the chances that a large random disturbance event, such as wildfire, would reduce the effectiveness of available habitat.

The Upper Salmon, and Upper and Lower Middle Forks of the Salmon River subbasins are predicted to increase from three stronghold populations to 59 or more strongholds for Alternatives 2, 3, 6, and 7. Alternatives 1B, 4, and 5 would increase up to 41 strongholds. If these predictions came true, adjacent subbasins such as the Pahsimeroi, Lemhi, and Middle Salmon-Panther could benefit from fish straying and re-colonizing accessible habitat. Strays entering the mainstem Pahsimeroi and Lemhi subbasins, however, would find limited access due to seasonal dewatering and areas where channels have been rerouted to facilitate water withdrawals. Currently, very few tributaries in the Pahsimeroi and Lemhi subbasins are connected to the mainstem during irrigation season (April through October) except in high water years.

Based upon the predicted viability outcomes, all alternatives appear to improve the chances of recovery over time, by decreasing depressed and increasing stronghold subpopulations. While no alternative by itself would ensure recovery or de-listing due to the multitude of cumulative influences involved, those alternatives that have the potential for a faster rate of aquatic restoration would more quickly reduce effects on spawning and rearing habitat. Aquatic restoration, coupled with other management changes, could make great strides in increasing the overall viability of subpopulations in the ESU. However, for the predicted increases to be realized, restoration must be funded and implemented with the appropriate prioritization, and improvement to the downstream survival must also occur. Additional high quality habitat alone is no guarantee of increased persistence without a comprehensive approach that addresses all mortality factors acting upon the population, including those outside the Ecogroup's jurisdiction (ICBEMP 1997a).

Effects on Snake River Fall Chinook Salmon, A Threatened Species – Issue 4

Direct and Indirect Effects on Fall Chinook

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use

Suited Timberland Acres – Based on suited timberland acres assigned by MPCs, Alternative 5 would have the greatest potential (71,873 acres) for impacts from commercial timber harvest and associated road activities. Alternatives 3, 1B, and 7 would have a moderate potential, and Alternatives 2, 4, and 6 a low potential for impacts from timber harvest and associated road activities (Table SW-41). Alternative 7 would have over 6,000 less suited acres (43 percent) than the No Action Alternative (1B), with the greatest difference occurring in the Lower Salmon subbasin.

Table SW-41. Acres of Suited Timber Base within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	564	0	0	0	5,965	0	564
Lower Salmon	14,321	4,040	15,650	0	65,907	3,705	7,965
Entire ESU	**14,885**	**4,040**	**15,650**	**0**	**71,873**	**3,705**	**8,529**

ERT Acres Compared to Subbasin TOCs - Most alternatives have ERT acres between 34 to 90 percent of the TOC for each subbasin in the first 20 years (Table SW-42).

Table SW-42. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins in the Snake River Fall Chinook ESU, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Hells Canyon	107	106	45	37	36	26	48	29	90	84	136	67	39	31
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41

Only the Hells Canyon subbasin has ERT acres above 100 percent in two alternatives (Table SW-42). Many of the higher ERT percentages are due to potential management activities to reduce wildfire risks and move vegetation toward desired conditions using fire reintroduction. The modeled ERT values exceeds the threshold of concern in Hells Canyon subbasin for Alternatives 1B and 6. However, lands managed by the Ecogroup comprise only 3 percent of the subbasin. Therefore any impacts are expected to be localized and pose little risk to fall chinook.

Issue 4, Indicator 2: Effects From Livestock Grazing

Suitable Rangeland Acres – Suitable rangeland acres are slightly lower in Alternatives 3, 4, 6 and 7 in the fall chinook ESU than in the current forest plans, represented by Alternative 1B (Table SW-43). Alternatives 2 and 5 are the same as 1B, or 18 percent suitable rangeland acres across the ESU. The Lower Salmon subbasin consistently has a higher percentage of suitable acres than Hells Canyon subbasin across all alternatives. This suggests that there would be a greater potential for grazing impacts in the Lower Salmon subbasin regardless of the alternative.

Table SW-43. Percent of Suitable Rangeland within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	12%	12%	4%	4%	12%	0%	2%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Entire ESU	**18%**	**18%**	**17%**	**17%**	**18%**	**17%**	**17%**

<u>*Less Restrictive vs. More Restrictive Grazing Management*</u> - Overall, the grazing management strategies would change significantly from the current forest plans in Alternatives 3, 4, and 7, from 3 percent to 77 percent or greater with more restrictive grazing strategies (Table SW-44). The Lower Salmon subbasin, even with 19 percent in suitable rangeland acres, would pose a lower risk under these alternatives due to the more restrictive management strategies in place (Table SW-4). These more restrictive strategies, coupled with the low amount of suitable rangeland acres in the Hells Canyon subbasin, would pose a low overall risk to fall chinook salmon and its critical habitat within lands administered by the Ecogroup in the ESU. Alternatives 1B, 2, 5 and 6 would pose a higher risk in the Lower Salmon subbasin because MPCs have less restrictive (74 to 97 percent of suited acres) management strategies.

Table SW-44. Percent of Less and More Restrictive Grazing Strategies within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Hells Canyon	100	0	99	1	98	2	97	3	100	0	55	45	98	2
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
Entire ESU	**97**	**3**	**76**	**24**	**23**	**77**	**7**	**93**	**97**	**3**	**95**	**5**	**17**	**83**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Issue 4, Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard
<u>*Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations*</u> – Because fall chinook do not occur on lands administered by the Ecogroup in the Lower salmon subbasin, there is no direct risk from uncharacteristic wildfire. However, four subwatersheds in the Lower Salmon subbasin are at high risk from uncharacteristic wildfires. If an uncharacteristic wildfire occurred, increased water and sediment yields may occur to fall chinook habitat downstream. In the Hell Canyon subbasin, one depressed fall chinook subpopulation (Deep Creek) is at high risk from uncharacteristic wildfires. Alternatives 2 to 5, and 7 could be the most

aggressive in reducing wildfire risk in Deep Creek, while Alternatives 1B and 6 would propose no treatments in this subwatershed. However, potential management and effects for any alternative in Deep Creek would be constrained because most of the subwatersheds are in wilderness or roadless areas (Table SW-45 and SW-46).

Table SW-45. Percent of Depressed Chinook Subwatersheds Where Risks from Uncharacteristic Wildfires Could be Reduced within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasin and ESU	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	100%	100%	100%	100%	0%	100%

Table SW-46. Percent of Depressed Chinook Subwatersheds Where Risks from Uncharacteristic Wildfires Would Remain High within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasin and ESU	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	100%	0%	0%	0%	0%	100%	0%

Risks from uncharacteristic wildfires to depressed chinook subpopulations would remain high for whose alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high risk from uncharacteristic wildfire subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires would be remain high in select areas of Deep Creek under Alternatives 1B and 6 due to the lack of potential treatments. The risks from uncharacteristic wildfires could be less under the other alternatives depending on the level of treatment implemented.

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations **-** There are no stronghold fall chinook subpopulations within lands administered by the Ecogroup.

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis –** Alternative 2 has MPCs that emphasize appropriate restoration and conservation in more high-priority subwatersheds (56 percent) identified by the WARS (Table SW-47) than other alternatives. Under this alternative, the Lower Salmon has the potential to see a relatively fast rate of aquatic restoration, given MPCs and number of ACS priority subwatersheds. However, fall chinook do not occur on lands administered by the Ecogroup in the Lower Salmon subbasin. Thus, benefits from restoration or conservation would be more indirect to habitat downstream and critical habitat in tributary streams. Benefits from restoration or conservation, however, would be more direct in the Hells Canyon subbasin.

Alternatives 1B, 3, 4, 6, and 7 have MPCs that emphasize limited aquatic restoration in the Lower Salmon subbasin. Alternative 5 has no MPCs that emphasize aquatic restoration. A few subwatersheds in the Lower Salmon subbasin, however, are ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or slowly trend toward recovery. Yet, many other subwatersheds do not fall within ACS priority subwatersheds. Localized effects to water quality, channel condition, watershed condition, and flow/hydrology pathways may continue to occur in these areas where problem sites are not addressed in the short term. This may cause effects downstream to where fall chinook and critical habitat occur.

Table SW-47. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Entire ESU	**33%**	**56%**	**33%**	**33%**	**0%**	**33%**	**33%**

No alternatives have MPCs that emphasize the appropriate restoration or conservation recommended by WARS to depressed populations in the Hells Canyon subbasin (Table SW-48). Although more restrictive management direction would help reduce threats, aquatic restoration would not be as aggressively pursued where needed in Deep Creek under any alternative (Table SW-48). Delays in restoration may also delay habitat improvements in the short term. These delays could place an already depressed fall chinook subpopulation at greater risk. Depressed fall chinook populations only occur downstream of subwatersheds administered by the Ecogroup Forests in the Lower Salmon subbasin and would not be affected directly by aquatic restoration.

Table SW-48. Percent of Depressed Chinook Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Fall Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
Entire ESU	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Issue 4, Indicator 5: Effects From Motorized Trail Use – Trails currently open to motorized use would be prohibited within proposed wildernesses under Alternatives 4 and 6. Under Alternative 4, the Lower Salmon would see the most closures where fall chinook critical habitat occurs. Under Alternative 6, no fall chinook subbasins would see trails closed. All motorized trails would remain open under remaining alternatives. The majority of motorized trails in the Lower Salmon occur in recommended wilderness. Their closure would concentrate use on remaining motorized trails in only a few areas, most of which are not in RCAs. Where use does occur, management direction for the action and no action alternatives would help to minimize most potential impacts. However, some impacts to riparian vegetation and stream banks from unauthorized ATV use may still occur. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but so few motorized trails in this subbasin exist that impacts to riparian vegetation and streams would be minimal.

Cumulative Effects on Fall Chinook

Non-federal actions are likely to continue affecting listed species. The greatest potential for cumulative effects from non-federal activities would occur in the Lower Salmon and Hell Canyon subbasins. Each subbasin has non-federal lands that comprise 40 percent or more of the acres in the action area. As described in the Cumulative Effects Common to all Alternatives section, degradation and loss of chinook trout habitat from non-federal actions would continue. Degraded baseline conditions, and threats from hatchery fish also would continue to stress populations in most subbasins. These effects, again, would be most severe on non-federal lands.

The level of risk associated with cumulative effects was evaluated for each subbasin in the fall chinook ESU within the Ecogroup. Alternatives 1B, 5 and 6 would have a slightly higher risk of cumulative effects based on greater timber, grazing, etc. management and less aquatic restoration, than the other alternatives (Table SW-49). In particular, the Lower Salmon could see more cumulative effects under these alternatives due to MPCs emphasizing more grazing with less restrictive management direction, combined with degraded baselines. The other alternatives would have the same risk of cumulative effects.

Table SW-49. Relative Risks* from Cumulative Effects within the Ecogroup Portion of the Snake River Fall Chinook ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	10	8	8	8	8	10	8
Lower Salmon	10	10	9	9	11	10	9
Entire ESU	**10**	**9**	**9**	**9**	**10**	**10**	**9**

*****Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Fall Chinook Salmon

A viability analysis was not run for fall chinook because the analysis for spring/summer chinook salmon, steelhead and bull trout was thought to adequately represent potential watershed condition changes for this species. Modeled outcomes for spring/summer chinook could be used to predict similar changes for fall chinook where the two species overlap. For example, the status of spring/summer chinook subpopulations would not change under most alternatives due in large part to MPCs not emphasizing the appropriate restoration recommended by WARS. However under the action alternatives, the lower restoration emphasis would be addressed by the ACS priority designation (Deep Creek) where fall chinook occur. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or slowly trend toward recovery.

Only Alternatives 2 and 4 would see some depressed spring/summer subpopulations trending toward stronghold subpopulations in 50 years. The fall chinook subpopulation in Deep Creek would also be expected to improve under Alternatives 2 and 4. How much fall chinook responds to watershed and habitat improvement under any alternative is dependent upon downstream influences in the Columbia River Basin.

Effects on Snake River Steelhead, A Threatened Species – Issue 4

Direct and Indirect Effects on Steelhead

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use

Suited Timberland Acres – Effects to steelhead trout are the same as those described for spring/summer chinook salmon.

Table SW-50. Acres of Suited Timber Base within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	564	0	0	0	5,965	0	564
Little Salmon River	55,551	45,737	39,749	0	106,844	34,799	49,374
Lower Middle Fork Salmon	733	0	0	0	12,359	0	0
Lower Salmon	14,321	4,040	15,650	0	65,907	3,705	7,965
Middle Salmon-Chamberlain	42,602	46,708	69,053	0	89,132	10,284	18,885
South Fork Salmon	225,154	10,939	10,415	0	393,402	2,655	20,836
Upper Middle Fork Salmon	44,360	0	0	0	79,965	0	0
Upper Salmon	113,446	1,021	1,018	0	178,545	0	1,018
Entire ESU	496,731	108,445	135,885	0	932,119	51,443	98,642

ERT Acres Compared to Subbasin TOCs **-** Effects to steelhead trout are the same as those described for spring/summer chinook salmon (Table SW-51).

Table SW-51. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins in the Snake River Steelhead ESU, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Hells Canyon	107	106	45	37	36	26	48	29	90	84	136	67	39	31
Little Salmon River	58	45	43	30	32	20	29	18	51	38	42	26	44	33
Lower M. F. Salmon	40	39	36	27	28	16	31	15	48	36	32	21	51	39
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41
Middle Salmon-Chamberlain	61	45	33	29	24	18	32	23	57	44	82	46	46	36
South Fork Salmon	72	56	66	43	44	33	35	25	63	50	52	33	78	53
Upper M. F. Salmon	112	90	61	46	55	37	50	31	61	51	61	38	90	66
Upper Salmon	42	26	120	70	85	50	69	52	42	36	62	38	125	75

Issue 4, Indicator 2: Effects From Livestock Grazing
Suitable Rangeland Acres – Effects to steelhead trout are the same as those described for spring/summer chinook salmon.

Table SW-52. Percent of Suitable Rangeland within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	12%	12%	4%	4%	12%	0%	2%
Little Salmon River	19%	19%	19%	19%	19%	19%	19%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Middle Salmon-Chamberlain	1%	1%	1%	1%	1%	1%	1%
South Fork Salmon	2%	2%	2%	2%	2%	2%	2%
Upper Middle Fork Salmon	1%	5%	5%	1%	5%	5%	1%
Upper Salmon	8%	8%	8%	8%	8%	8%	8%
Entire ESU	**6%**	**6%**	**5%**	**4%**	**6%**	**5%**	**4%**

Less Restrictive vs. More Restrictive Grazing Management - Effects to steelhead trout are the same as those described for spring/summer chinook salmon.

Table SW-53. Percent of Less and More Restrictive Grazing Strategies within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Hells Canyon	100	0	99	1	98	2	97	3	100	0	55	45	98	2
Little Salmon River	97	3	88	12	49	51	18	82	84	16	89	11	58	42
Lower M. F. Salmon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
Middle Salmon-Chamberlain	100	0	100	0	93	7	0	100	100	0	100	0	2	98
South Fork Salmon	79	21	40	60	1	99	0	100	85	15	62	38	8	92
Upper M. F. Salmon	88	12	18	82	0	100	0	100	100	0	53	47	0	100
Upper Salmon	78	22	10	90	1	99	16	84	100	0	42	58	1	99
Entire ESU	**85**	**15**	**47**	**53**	**17**	**83**	**12**	**88**	**93**	**7**	**66**	**34**	**23**	**77**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Issue 4, Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard
Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations – Six of the eight subbasins where steelhead occur have subwatersheds at high risk from uncharacteristic wildfires. The Upper Salmon and Upper Middle Fork Salmon subbasins do not. In these subbasins there are 48 subwatersheds with depressed steelhead at high risk (Table SW-54). Each alternative assigns MPCs that more aggressively treat vegetation to reduce fuel loading. Alternatives 1B, 2, 3, 5, and 7 are the most aggressive, potentially treating more than 50 percent of

all subwatersheds where depressed steelhead subpopulations occur within the Ecogroup across the ESU. In some subbasins, under these alternatives, all subwatersheds with depressed populations could see treatment. Alternatives 4 and 6 would treat the least amount (4 to 13 percent) of subwatersheds with depressed chinook subpopulations.

Table SW-54. Percent of Depressed Steelhead Subwatersheds Where Risks from Uncharacteristic Wildfires Could be Reduced within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	100%	100%	100%	100%	0%	100%
Little Salmon River	25%	50%	100%	0%	100%	50%	75%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	60%	60%	100%	0%	100%	20%	40%
Middle Salmon-Chamberlain	50%	50%	67%	0%	67%	17%	50%
South Fork Salmon	50%	32%	32%	4%	71%	7%	43%
Entire ESU	**47%**	**40%**	**49%**	**4%**	**73%**	**13%**	**47%**

Table SW-55. Percent of Depressed Steelhead Subwatersheds Where Risks from Uncharacteristic Wildfires Would Remain High within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	100%	0%	0%	0%	0%	100%	0%
Little Salmon River	75%	50%	0%	100%	0%	80%	60%
Lower Middle Fork Salmon	100%	100%	100%	100%	100%	100%	100%
Lower Salmon	40%	40%	0%	100%	0%	80%	60%
Middle Salmon-Chamberlain	50%	50%	33%	100%	33%	83%	50%
South Fork Salmon	50%	68%	68%	96%	29%	93%	57%
Entire ESU	**55%**	**61%**	**50%**	**98%**	**25%**	**89%**	**55%**

Risks from uncharacteristic wildfires to depressed steelhead subpopulations would remain high for whose alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high risk from uncharacteristic wildfire subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires would remain high across 89 to 98 percent of the depressed steelhead subpopulations within the Ecogroup and ESU under Alternatives 4 and 6 due to the lack of potential treatments. This would be followed by Alternatives 1B, 2, 3, and 7 with 50 to 61 percent of the depressed steelhead subpopulations still having a high risk from uncharacteristic wildfires and Alternative 5 with 25 percent still having a high risk from uncharacteristic wildfires.

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations - There are four subwatersheds considered as strongholds for steelhead in the Ecogroup and ESU (Table SW-56), all in the Little Salmon River subbasin. Three of the steelhead subpopulations are at high risk from uncharacteristic wildfires. Based on MPC emphasis, treatments to reduce uncharacteristic wildfire risks in three steelhead strongholds in the Little Salmon subbasin could vary by alternative. All (100 percent) of the strongholds could be treated under Alternatives 3 and 5; one third (33 percent) could be treated under Alternatives 2 and 6; and no strongholds would be treated under Alternatives 1B, 4 and 7. Because high emphasis treatments occur in some of the last remaining strongholds, management activities may pose a greater risk to steelhead than if an uncharacteristic wildfire occurred for Alternatives 2, 3, 5, and 6. Management direction for the action alternatives would help to minimize many management effects (see Direct and Indirect Effects Common to all Alternatives). However, there would still be some risk of impacts to stronghold subwatersheds in each alternative from roads and mechanical/fire treatments.

Table SW-56. Percent of Stronghold Steelhead Subwatersheds Where Risks from Management Treatments For Uncharacteristic Wildfires Would be Higher within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasin and ESU	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	0%	33%	100%	0%	100%	33%	0%

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis** - All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. Alternatives 2, 3, 7, and 6 have MPCs that emphasize the most appropriate restoration or conservation in 71, 70, 68, and 58 percent, respectively, of the high priority subwatersheds identified by the WARS (Table SW-57). Under these alternatives, the Upper Salmon, South Fork Salmon, Lower Middle Fork Salmon and Upper Middle Fork Salmon have the most potential for timely aquatic restoration given their MPCs and number of ACS priority subwatersheds. This restoration emphasis, coupled with more restrictive management direction, should make great strides in reducing existing impacts and improving watershed/habitat conditions. Restoration would slowly decrease the number of water quality limited streams and damaged stream segments identified in the environmental baselines. It would also indirectly benefit steelhead by helping to restore subwatersheds that influence migratory corridors.

Table SW-57. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
Little Salmon River	42%	75%	67%	50%	17%	67%	42%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Middle Salmon-Chamberlain	56%	56%	49%	61%	49%	59%	61%
South Fork Salmon	30%	64%	66%	34%	25%	43%	67%
Upper Middle Fork Salmon	50%	83%	83%	83%	33%	83%	75%
Upper Salmon	18%	78%	85%	18%	15%	58%	73%
Entire ESU	**43%**	**71%**	**70%**	**47%**	**34%**	**58%**	**68%**

Not all subbasins under Alternatives 2, 3, 6, and 7, however, have MPCs with the same restoration emphasis as WARS. In the Lower Salmon and Little Salmon subbasins, less than half of the high priority subwatersheds would receive the appropriate restoration and conservation recommended by WARS under Alternative 7. While, for the Lower Salmon subbasin, less than half of the high priority subwatersheds would receive the appropriate restoration under Alternative 3. Many of these areas, however, fall within ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or slowly trend toward recovery. Yet, some areas that do not fall within ACS priority subwatersheds may continue to see localized effects to water quality, channel condition, watershed condition, and flow/ hydrology pathways where problem sites are not immediately addressed.

In contrast, Alternatives 4, 1B, and 5 have MPCs that emphasize the appropriate restoration and conservation in little more than a third of the high priority subwatersheds identified by WARS in the Ecogroup in the ESU. Under these alternatives the Lower Middle Fork Salmon and Middle Salmon-Chamberlain subbasins have the potential for the most aquatic restoration. Although more restrictive management direction would help reduce effects, aquatic restoration in many subbasins may not be as aggressively pursued under these alternatives. Delays in restoration may also delay habitat improvements in the short term. This could place already depressed steelhead populations at greater risk in portions of each subbasin.

<u>*Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations*</u> **-** Alternatives 3, 2, and 6 have MPCs that emphasize the appropriate restoration and conservation recommended by the WARS to more subwatersheds containing depressed steelhead subpopulations (Table SW-59) than other alternatives. Alternatives 2, 3, 7, and 6 have MPCs that emphasize the appropriate restoration and conservation recommended by the WARS in a relatively high percentage (71, 69, 69, and 59, respectively) of subwatersheds containing stronghold steelhead subpopulations (Table SW-58). Most subbasins in the Ecogroup area with steelhead subpopulations would see improved habitat and watershed conditions as restoration is implemented. In contrast, Alternatives 1B, 4, 5, and 7 have less potential to improve habitat and watershed conditions in a timely manner.

Table SW-58. Percent of Steelhead Strongholds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins* in the Snake River Steelhead ESU, by Alternative

Subbasin and ESU	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	50%	75%	100%	50%	0%	75%	50%

*The other subbasins in this ESU do not have any steelhead strongholds.

Table SW-59. Percent of Depressed Steelhead Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
Little Salmon River	33%	67%	33%	335	0%	67%	33%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	43%	71%	29%	43%	0%	43%	43%
Middle Salmon-Chamberlain	58%	58%	50%	63%	50%	60%	63%
South Fork Salmon	30%	64%	66%	34%	25%	43%	67%
Upper Middle Fork Salmon	42%	75%	83%	75%	25%	75%	67%
Upper Salmon	16%	78%	86%	16%	14%	57%	73%
Entire ESU	**43%**	**71%**	**69%**	**47%**	**35%**	**59%**	**69%**

Issue 4, Indicator 5: Effects from Motorized Trail Use - Trails currently open to motorized use would be prohibited within proposed wildernesses under Alternatives 4 and 6. Under Alternative 4, the South Fork Salmon, Little Salmon, Lower Salmon, and Upper Salmon would see the most closures. Under Alternative 6, the South Fork Salmon and Upper Salmon would see the most closures. All motorized trails would remain open under remaining alternatives. Trail closures in these subbasins could result in more concentrated use on remaining motorized trails. Subbasins with more motorized trails in RCA potentially could also see more impacts to steelhead and their habitat. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects on Steelhead

Non-federal actions are likely to continue affecting listed species. Effects to steelhead from non-federal lands would be low overall in the Salmon River Basin when compared to other areas in the Ecogroup. Non-federal lands comprise only 10 percent of the Salmon River Basin. However, cumulative effects from non-federal lands would be high in individual subbasins such as the Lemhi, Little Salmon and Lower Salmon. As described in the Cumulative Effects Common to all Alternatives, degradation and loss of habitat from non-federal actions would continue. Degraded baseline conditions, and threats from hatchery fish also would continue to stress populations in most subbasins.

The level of risk associated with cumulative effects was evaluated for each subbasin in the Snake River steelhead ESU within the Ecogroup area. Alternatives 1B, 5, 6 would have a slightly higher risk of cumulative effects based on greater timber, grazing, etc. management and less aquatic restoration, than the other alternatives (Table SW-60). In particular, the Little Salmon and Lower Salmon could see more cumulative effects under these alternatives. Remaining alternatives have slightly lower risks of cumulative effects than Alternatives 1B, 5 and 6. However, several subbasins still have a high risk of cumulative effects, - Specifically due to more grazing with less restrictive management direction in Lower Salmon, and more grazing with less restrictive management direction and potential treatments to reduce fire risk in steelhead strongholds in the Little Salmon, combined with degraded baselines.

Table SW-60. Relative Risks* from Cumulative Effects within the Ecogroup Portion of the Snake River Steelhead ESU, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	10	8	8	8	8	10	8
Little Salmon River	11	12	11	10	14	12	11
Lower Middle Fork Salmon	6	6	6	6	6	6	6
Lower Salmon	10	10	9	9	11	10	9
Middle Salmon-Chamberlain	7	7	7	7	7	7	7
South Fork Salmon	7	7	7	7	7	7	6
Upper Middle Fork Salmon	10	6	6	6	8	6	6
Upper Salmon	8	8	6	8	8	7	8
Entire ESU	**9**	**8**	**8**	**8**	**9**	**9**	**8**

*****Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Steelhead

Projected trends for steelhead over the first 15 years show that the number of stronghold subpopulations would remain unchanged. This is because it will take time for subpopulations to respond to restoration and passive/conservation measures. The number depressed subpopulations would change slightly (Table SW-61) for those alternatives that have active restoration MPCs within currently absent, but "linked" subwatersheds. It is assumed in these subwatersheds that fish habitat functioning at unacceptable risk is due to poor Geomorphic and/or Water Quality Integrity. Active restoration could begin to improve these limiting factors in 15 years so that fish could re-colonize from adjacent areas. Large numbers of fish would not be expected to re-colonize each subwatershed initially. Thus, these recolonized subwatersheds would at first be depressed, increasing the number of depressed subpopulations in the first 15 years. Restoration again would not improve enough of the overall subwatershed condition to trend existing depressed populations to strong ones in 15 years.

Table SW-61. Number of Stronghold and Depressed Steelhead Subwatersheds at 15 Years within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Hells Canyon	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3
Little Salmon River	4	10	4	10	4	12	4	12	4	10	4	10	4	12	4	10
Lower M.F. Salmon	0	28	0	28	0	28	0	28	0	28	0	28	0	28	0	28
Lower Salmon	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Middle Salmon-Chamberlain	0	48	0	48	0	48	0	48	0	48	0	48	0	48	0	48
South Fork Salmon	0	70	0	70	0	70	0	70	0	70	0	70	0	70	0	70
Upper M.F. Salmon	0	16	0	16	0	16	0	16	0	16	0	16	0	16	0	16
Upper Salmon	0	47	0	47	0	48	0	48	0	47	0	47	0	48	0	49
Totals	**4**	**232**	**4**	**232**	**4**	**235**	**4**	**235**	**4**	**232**	**4**	**232**	**4**	**235**	**4**	**234**

S = Stronghold Subpopulations; D = Depressed Subpopulations

Projected trends over the long-term indicate a positive trend from current conditions for stronghold subpopulations under all alternatives. These predictions are based upon populations responding favorably to active and passive restoration and conservation measures. However, these predictions do not reflect changes in migration corridor survival from downstream influences in the Columbia River Basin, non-native species, harvest trends, etc. It is assumed that the temporary and short-term effects from Ecogroup activities would not compromise the benefits of restoration and conservation due to new and existing management direction. Alternatives 3, 2, 7, and 6 show the greatest increase in the number of stronghold subpopulations due to having more MPCs that emphasize the appropriate restoration and conservation within high priority subwatersheds identified by the WARS (Table SW-62).

Table SW-62. Number of Stronghold and Depressed Steelhead Subwatersheds at 50 Years within Subbasins in the Snake River Steelhead ESU, by Alternative

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Hells Canyon	0	3	0	3	1	2	0	3	2	1	0	3	0	3	0	3
Little Salmon River	4	10	6	8	10	6	8	8	14	0	4	10	10	6	6	8
Lower M.F. Salmon	0	28	26	2	27	1	27	1	4	24	25	3	26	2	27	1
Lower Salmon	0	10	3	7	5	5	3	8	9	1	0	10	3	7	3	7
Middle Salmon-Chamberlain	0	48	25	23	25	23	22	26	10	38	22	26	26	22	27	21
South Fork Salmon	0	70	21	49	46	24	47	23	58	10	19	51	31	39	48	22
Upper M.F. Salmon	0	16	4	12	8	8	9	7	1	15	2	12	9	7	8	8
Upper Salmon	0	47	5	42	32	16	39	10	5	41	4	43	23	25	31	18
Totals	**4**	**231**	**90**	**146**	**154**	**85**	**155**	**86**	**99**	**128**	**76**	**160**	**128**	**111**	**150**	**88**

S = Stronghold Subpopulations; D = Depressed Subpopulations

In 50 years, under Alternatives 2, 3, 6, and 7, steelhead subpopulations are predicted to improve from 4 strong subpopulation subwatersheds up to a range of 128 (Alt. 6) to 155 (Alt. 3). Some of the largest increases would occur in the Upper Salmon, Upper and Lower Middle Forks of the Salmon River, and Middle Salmon-Chamberlain subbasins under these alternatives. Alternatives 1B and 4 would have moderate increase from 4 up to 99 stronghold subwatersheds, and Alternatives 5 would have the smallest increase (76) in stronghold subwatersheds.

The predicted increase in strongholds is a result of the greater restoration emphasis, adjustments to grazing and vegetation management, and protection provided by management direction for all action alternatives. As more subwatersheds support strong subpopulations, population risks should decrease. In particular, restoration should improve density dependent (e.g., sex ratios, etc.) and genetic diversity factors. Many of the remaining strongholds for steelhead are clustered in a few subwatersheds in one subbasin and are at high risk from disturbances. Stronger populations should result in more dispersed and resilient metapopulations across each subbasin, reducing the risks from uncharacteristic disturbance events. Restoration and conservation should also increase the availability of high quality habitats, thereby decreasing the chances that a large random disturbance event, such as wildfire, would reduce the effectiveness of available habitat.

The Upper Salmon, and Upper and Lower Middle Forks of the Salmon River subbasins are predicted to increase from no stronghold subpopulations subwatersheds up to a range of 58 (Alt. 6) to 75 (Alt. 3) for Alternatives 2, 3, 6, and 7. Alternatives 1B, 4, and 5 would increase up to a range of 0 (Alt. 1B and 4) to 31(Alt. 5) strongholds. If these predictions came true, adjacent subbasins such as the Pahsimeroi, Lemhi, and Middle Salmon-Panther could benefit from fish straying and re-colonizing accessible habitat. Strays entering the mainstem Pahsimeroi and Lemhi subbasins, however, would find limited access due to seasonal dewatering and areas where channels have been rerouted to facilitate water withdrawals. Currently, very few tributaries in the Pahsimeroi and Lemhi subbasins are connected to the mainstem during irrigation season (April through October) except in high water years.

Based upon the predicted viability outcomes, all alternatives appear to improve the chances of recovery over time, by decreasing depressed and increasing stronghold subpopulations. While no alternative by itself would ensure recovery or de-listing due to the multitude of cumulative influences involved, those alternatives that have the potential for a faster rate of aquatic restoration would more quickly reduce existing impacts on spawning and rearing habitat. Aquatic restoration, coupled with other management changes, could make great strides in increasing the overall viability of subpopulations in the Ecogroup. However, for the predicted increases to be realized, restoration must be funded and implemented with the appropriate prioritization, and improvement to the downstream survival must also occur. Rehabilitation of depressed populations cannot be accomplished via habitat improvements alone, but would require improvements in migration corridor survival (Marmorek et al. 1998) and efforts to address causes of mortality in other life stages (Quigley and Arbelbide 1997).

Effects on Bull Trout, A Threatened and Management Indicator Species – Issue 4

Direct and Indirect Effects on Bull Trout

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use

Suited Timberland Acres – Based on suited timberland acres assigned by MPCs, Alternatives 1B, 2, 3, and 5 have the greatest potential (1,093,122 to 2,510,948 acres) for impacts from commercial timber harvest and associated road activities over the range of bull trout in the Ecogroup. Alternatives 6 and 7 would have a moderate potential, and Alternative 4 would have a low potential for impacts from timber harvest and associated road activities (Table SW-63). The Southwest Idaho and Hells Canyon Recovery Units would support more suited acres compared to other recovery units. For example, the Southwest Idaho Recovery Unit would support at least 60 percent or more of the suited acres under each alternative. In particular, the South Fork Boise River, South Fork Payette, and Weiser subbasins could see a greater risk of impacts under Alternatives 1B, 2, 3, and 5 than other alternatives that propose less suited timberland acres in this recovery unit. In the Salmon River recovery Unit, the Little Salmon and South Fork Salmon could see a greater risk of impacts. Overall, Alternative 7 would have far less suited timber base than Alternative 1B, with the greatest differences occurring in the South Fork Payette, Upper Salmon, South Fork Salmon, and Lower and Upper Middle Forks of the Salmon River subbasins.

Table SW-63. Acres of Suited Timber Base within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	71,845	68,542	72,331	0	99,843	52,434	66,763
Imnaha Recovery Unit							
Hells Canyon	564	0	0	0	5,965	0	564
SW Idaho Recovery Unit							
Boise-Mores	107,748	110,498	97,382	5,903	125,555	42,142	91,355
Middle Fork Payette	85,695	76,071	69,912	0	142,349	40,328	52,532
North and Middle Fork Boise	104,294	103,624	64,427	0	188,269	65,068	77,439
North Fork Payette	106,879	115,648	89,018	0	164,301	60,882	88,205
Payette	55,062	57,584	67,463	0	80,407	45,154	53,310
South Fork Boise River	172,151	178,055	168,038	3,212	263,070	62,349	106,213
South Fork Payette	180,187	195,491	165,692	0	303,980	53,268	98,633
Weiser River	165,038	164,839	162,974	0	211,055	117,228	162,721
Entire Recovery Unit	977,054	1,001,810	884,906	9,115	1,478,986	486,419	730,408
Salmon River Recovery Unit							
Little Salmon River	55,551	45,737	39,749	0	106,844	34,799	49,374
Lower Middle Fork Salmon	733	0	0	0	12,359	0	0
Lower Salmon	14,321	4,040	15,650	0	65,907	3705	7,965
Middle Salmon-Chamberlain	42,602	46,708	69,053	0	89,132	10284	18,885
South Fork Salmon	225,154	10,939	10,415	0	393,402	2655	20,836
Upper Middle Fork Salmon	44,360	0	0	0	79,965	0	0
Upper Salmon	113,446	1,021	1,018	0	178,545	0	1,018
Entire Recovery Unit	496,167	108,445	135,885	0	926,154	51,443	98,078
All Recovery Units	**1,545,630**	**1,178,797**	**1,093,122**	**9,115**	**2,510,948**	**590,296**	**895,813**

<u>ERT Acres Compared to Subbasin TOCs</u> - Most alternatives have ERT acres between 16 to 93 percent of the TOC for each subbasin in the first 20 years (Table SW-64). The shaded boxes in the table indicate alternatives and subbasins where the TOC could be exceeded based on MPC modeling assumptions. Actual treatment acres would depend on site-specific proposals, analysis, consultation, and mitigation, which would no doubt modify the numbers presented below.

Table SW-64. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins in Bull Trout Recovery Units, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Hells Canyon Recovery Unit														
Brownlee Reservoir	44	40	27	23	16	15	24	20	32	33	30	25	39	35
Imnaha Recovery Unit														
Hells Canyon	107	106	45	37	36	26	48	29	90	84	136	67	39	31
SW Idaho Recovery Unit														
Boise-Mores	36	38	18	31	18	22	18	26	33	37	16	26	26	40
Middle Fork Payette	93	56	41	34	39	31	38	28	76	67	47	37	68	63
North and M. Fork Boise	38	37	21	28	19	23	19	24	26	31	20	24	34	36
North Fork Payette	63	57	69	47	46	35	38	26	56	45	50	33	79	56
Payette	63	58	64	43	48	38	30	22	52	48	46	34	72	58
South Fork Boise River	24	24	22	23	18	19	15	23	21	23	19	20	43	36
South Fork Payette	64	56	35	34	33	31	31	28	49	47	40	33	62	51
Weiser River	35	36	25	22	22	18	22	20	30	34	31	26	37	38
Salmon River Recovery Unit														
Little Salmon River	58	45	43	30	32	20	29	18	51	38	42	26	44	33
Lower M. F. Salmon	40	39	36	27	28	16	31	15	48	36	32	21	51	39
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41
Middle Salmon-Chamberlain	61	45	33	29	24	18	32	23	57	44	82	46	46	36
South Fork Salmon	72	56	66	43	44	33	35	25	63	50	52	33	78	53
Upper M. F. Salmon	112	90	61	46	55	37	50	31	61	51	61	38	90	66
Upper Salmon	42	26	120	70	85	50	69	52	42	36	62	38	125	75

Only the Hells Canyon, Upper Middle Fork Salmon and Upper Salmon River subbasins have ERT acres above the 100 percent TOC in select alternatives. Many of the higher acre percentages are due to potential management activities to reduce wildfire risks and move vegetation toward desired conditions using fire reintroduction and mechanical thinning. Because the modeled ERT value exceeds the threshold of concern, the potential effects to bull trout and its habitat could be high in the short term in Upper Middle Fork Salmon in Alternative 1B and Upper Salmon in Alternatives 2 and 7. Although ERT values exceed the threshold of concern under Alternatives 1B and 6 in Hells Canyon, lands managed by the Ecogroup comprise only 3 percent of the subbasin. Therefore, any impacts are expected to be localized and pose little risk to bull trout. Remaining effects (see Effects Common to All Alternatives) to water quality, watershed condition, and flow/hydrology could occur depending on the intensity of activities proposed in each alternative. Most of these affected pathways are also currently "functioning at risk" for the Upper Middle Fork Salmon and Upper Salmon subbasins. This suggests some subwatersheds may be more sensitive to proposed management actions.

Issue 4, **Indicator 2: Effects From Livestock Grazing**

Suitable Rangeland Acres – Suitable rangeland acres are slightly less under Alternatives 2, 3, 4, 6, and 7 across the Ecogroup where bull trout occur from the current forest plans, represented by Alternative 1B (Table SW-65). Alternative 5 is the same as 1B, or 12 percent suitable rangeland acres across the Ecogroup. Suited rangeland acres are also slightly less under Alternatives 2, 3, 4, 6 and 7 in most recovery units. Suitable rangeland acres are less than 10 percent in the majority of subbasins in the Salmon River Recovery Unit. However, the Brownlee Reservoir in the Hells Canyon Recovery Unit, and most subbasins in the Southwest Idaho Recovery Unit have suited rangeland acres over 20 percent of the land administered in the Ecogroup. In particular the Brownlee Reservoir, Boise-Mores, Middle Fork Payette, North Fork and Middle Fork Boise, Payette, South Fork Boise, Weiser, Little Salmon, and Lower Salmon subbasins consistently have a higher potential for grazing impacts due to a higher amount of suitable acres (19 percent or higher). Hells Canyon would also have potential for more impacts under Alternatives 1B, 2, and 5 (12 percent).

A higher percent of acres grazed by cattle or sheep in these subbasins will require vigilant application of management direction to minimize effects. Some temporary effects will occur to riparian vegetation, water quality, and stream channels where bull trout or its proposed critical habitat is present. Project level consultation on pastures and allotments will require careful analysis and monitoring to ensure affects are mitigated to the greatest extent possible and management direction is properly implemented.

Table SW-65. Percent of Suitable Rangeland within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	27%	27%	19%	19%	27%	19%	27%
Imnaha Recovery Unit							
Hells Canyon	12%	12%	4%	4%	12%	0%	2%
SW Idaho Recovery Unit							
Boise-Mores	27%	26%	26%	26%	27%	26%	26%
Middle Fork Payette	24%	20%	20%	20%	24%	20%	20%
North and Middle Fork Boise	22%	21%	21%	21%	22%	21%	21%
North Fork Payette	11%	11%	11%	11%	11%	11%	11%
Payette	32%	32%	32%	32%	32%	32%	32%
South Fork Boise River	22%	22%	22%	22%	22%	22%	22%
South Fork Payette	7%	4%	4%	4%	7%	4%	4%
Weiser River	32%	32%	32%	32%	32%	32%	32%
Entire Recovery Unit	21%	19%	19%	19%	21%	19%	19%

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Salmon River Recovery Unit							
Little Salmon River	19%	19%	19%	19%	19%	19%	19%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Middle Salmon-Chamberlain	1%	1%	1%	1%	1%	1%	1%
South Fork Salmon	2%	2%	2%	2%	2%	2%	2%
Upper Middle Fork Salmon	1%	5%	5%	1%	5%	5%	1%
Upper Salmon	8%	8%	8%	8%	8%	8%	8%
Entire Recovery Unit	4%	5%	5%	4%	5%	5%	4%
All Recovery Units	**13%**	**12%**	**12%**	**12%**	**13%**	**12%**	**12%**

Less Restrictive vs. More Restrictive Grazing Management - MPC emphasis and management direction also needs to be considered in addition to suited rangeland acres. Those alternatives and subbasins with a higher amount of suited rangeland acres and MPCs with less restrictive grazing direction have a greater potential for temporary and short-term effects to matrix pathways. The combination of moderate amounts of suited rangeland acres and high percentage of less restrictive grazing strategies in the Hell Canyon and Southwest Idaho recovery units implies there is a greater chance for temporary effects to bull trout and its proposed critical habitat. In particular, the Brownlee Reservoir, Boise-Mores, Middle Fork Payette, North Fork and Middle Fork Boise, Payette, South Fork Boise, Weiser, Little Salmon, and Lower Salmon subbasins could have more grazing impacts due to a higher percentage of the suited rangeland acres having less restrictive MPCs. Only Alternative 4 could have fewer impacts due to more restrictive MPCs.

Most matrix pathways in the above subbasin are currently "functioning at risk" (refer to Environmental Baseline in Current Conditions). This suggests that these subbasins may be more sensitive to grazing activities and effects. Alternatives that would have the most restrictive grazing strategies in these subbasins are, in descending order: 4, 3, 7, 2, 1B, 6, and 5.

Table SW-66. Percent of Less and More Restrictive Grazing strategies within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Hells Canyon Recovery Unit														
Brownlee Reservoir	100	0	100	0	99	1	0	100	100	0	100	0	98	2
Imnaha Recovery Unit														
Hells Canyon	100	0	99	1	98	2	97	3	100	0	55	45	98	2
SW Idaho Recovery Unit														
Boise-Mores	100	0	95	5	87	13	90	10	96	4	96	4	95	5
Middle Fork Payette	100	0	94	6	94	6	51	49	100	0	100	0	100	0
North and Middle Fork Boise	83	17	82	18	68	32	13	87	93	7	88	12	78	22
North Fork Payette	79	21	78	22	48	52	8	82	100	0	78	22	52	48
Payette	100	0	100	0	100	0	51	49	100	0	100	0	100	0
South Fork Boise River	100	0	95	5	89	11	29	71	100	0	99	1	94	6
South Fork Payette	76	24	94	6	93	7	27	73	100	0	94	6	89	11
Weiser River	79	21	100	0	100	0	0	100	100	0	100	0	52	48
Entire Recovery Unit	90	10	93	7	87	13	34	66	98	2	95	5	87	13
Salmon River Recovery Unit														
Little Salmon River	97	3	88	12	49	51	18	82	84	16	89	11	58	42
Lower M. F. Salmon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
Middle Salmon-Chamberlain	100	0	100	0	93	7	0	100	100	0	100	0	2	98
South Fork Salmon	79	21	40	60	1	99	0	100	85	15	62	38	8	92
Upper M. F. Salmon	88	12	18	82	0	100	0	100	100	0	53	47	0	100
Upper Salmon	78	22	10	90	1	99	16	84	100	0	42	58	1	99
Entire Recovery Unit	85	15	47	53	17	83	12	88	93	7	66	34	23	77
All Recovery Units	**90**	**10**	**86**	**14**	**76**	**24**	**31**	**69**	**97**	**3**	**91**	**9**	**77**	**23**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Overall, grazing management strategies would change significantly from the current forest plans in Alternatives 2, 3, 4, and 7, from 15 percent to 53 percent or more with more restrictive grazing strategies in the Salmon River Recovery Unit (Table SW-66). The Lower Salmon, South Fork Salmon, Upper Middle Fork Salmon, Middle Salmon-Chamberlain, and Upper Salmon subbasins would see the greatest change in MPC grazing strategies from the current forest plans, represented by Alternative 1B. The change in management strategies would help reduce effects and achieve TEPC fish and SWRA resource objectives. Risks to bull trout would be lower in the Salmon River and Imnaha-Snake recovery units because low overall acres of suited rangelands and/or the limited grazing system.

In the Southwest Idaho, Imnaha, and Hell Canyon Recovery Units, grazing management strategies would change very little (97-100 percent to 87-100 percent with a less restrictive grazing strategy) under most alternatives, except for Alternative 4 in Hells Canyon and Imnaha for Alternative 6.

Issue 4, **Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard**
Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations – The majority of the subwatersheds at risks from uncharacteristic wildfires occur in the South Fork Salmon, Lower Salmon, and Little Salmon River subbasins (Salmon River Recovery Unit), Brownlee Reservoir subbasin (Hell Canyon Recovery Unit) and South Fork Payette, Payette, South Fork Boise, and North Fork/Middle Fork Boise subbasins (Southwest Idaho Recovery Unit). Over the entire Ecogroup fourteen of the subbasins where bull trout occur have subwatersheds at high risk from uncharacteristic wildfires. The Upper Salmon and Upper Middle Fork Salmon subbasins do not have subwatersheds at high risk from uncharacteristic wildfires.

Each alternative assigns MPCs that more aggressively treat vegetation to reduce fuel loading. Alternatives 1B, 2, 3, 5, and 7 are the most aggressive in the Southwest Idaho Recovery Unit, potentially treating more than 69 percent of all subwatersheds where depressed bull trout populations occur within the Ecogroup. In some subbasins, under these alternatives, all subwatersheds with depressed populations could see treatment. Alternative 4 would treat the least amount (17 percent) of subwatersheds with depressed bull trout populations in this recovery unit.

Alternatives 3 and 5 in the Salmon River, Alternatives 3, 4, and 7 in the Hells Canyon, and Alternatives 2, 3, 4, 5, and 7 in the Imnaha Recovery Units are the most aggressive, potentially treating more than 53 percent of all subwatersheds where depressed bull trout populations

Table SW-67. Percent of Depressed Bull Trout Subwatersheds Where Risks From Uncharacteristic Wildfires Could Be Reduced within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	20%	40%	80%	100%	20%	40%	80%
Imnaha Recovery Unit							
Hells Canyon	0%	100%	100%	100%	100%	0%	100%
SW Idaho Recovery Unit							
Boise-Mores	100%	100%	100%	100%	100%	100%	100%
Middle Fork Payette	66%	66%	100%	0%	100%	0%	100%
North and Middle Fork Boise	75%	75%	25%	50%	25%	25%	75%
North Fork Payette	NA	NA	NA	NA	NA	NA	NA
Payette	50%	50%	100%	100%	100%	50%	100%
South Fork Boise River	75%	75%	100%	63%	100%	13%	100%
South Fork Payette	43%	43%	43%	14%	86%	0%	43%
Weiser River	100%	100%	100%	100%	100%	0%	100%
Entire Recovery Unit	69%	79%	76%	52%	86%	17%	83%

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Salmon River Recovery Unit							
Little Salmon River	25%	50%	100%	0%	100%	50%	25%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	60%	60%	100%	0%	100%	20%	40%
Middle Salmon-Chamberlain	57%	57%	71%	0%	71%	29%	57%
South Fork Salmon	43%	29%	36%	4%	71%	7%	43%
Upper Middle Fork Salmon	NA	NA	NA	NA	NA	NA	NA
Upper Salmon	NA	NA	NA	NA	NA	NA	NA
Entire Recovery Unit	44%	38%	53%	2%	76%	16%	42%
All Recovery Units	**54%**	**50%**	**62%**	**22%**	**80%**	**16%**	**58%**

Table SW-68. Percent of Depressed Bull Trout Subwatersheds Where Risks from Uncharacteristic Wildfires Would Remain High within Subbasins in Bull Trout Recovery, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	80%	60%	20%	0%	80%	60%	20%
Imnaha Recovery Unit							
Hells Canyon	100%	0%	0%	0%	0%	100%	0%
SW Idaho Recovery Unit							
Boise-Mores	0%	0%	0%	0%	0%	0%	0%
Middle Fork Payette	33%	33%	0%	100%	0%	100%	0%
North and Middle Fork Boise	25%	25%	75%	50%	75%	75%	25%
North Fork Payette	NA	NA	NA	NA	NA	NA	NA
Payette	50%	50%	0%	0%	0%	50%	0%
South Fork Boise River	25%	25%	0%	37%	0%	87%	0%
South Fork Payette	57%	57%	57%	86%	14%	100%	57%
Weiser River	0%	0%	0%	0%	0%	100%	0%
Entire Recovery Unit	31%	31%	24%	48%	14%	83%	17%
Salmon River Recovery Unit							
Little Salmon River	75%	50%	0%	100%	0%	50%	75%
Lower Middle Fork Salmon	100%	100%	100%	100%	100%	100%	100%
Lower Salmon	40%	40%	0%	100%	0%	80%	60%
Middle Salmon-Chamberlain	43%	43%	29%	100%	29%	71%	43%
South Fork Salmon	57%	71%	64%	96%	29%	93%	57%
Upper Middle Fork Salmon	NA	NA	NA	NA	NA	NA	NA
Upper Salmon	NA	NA	NA	NA	NA	NA	NA
Entire Recovery Unit	56%	62%	47%	98%	24%	84%	58%
All Recovery Units	**46%**	**50%**	**38%**	**78%**	**20%**	**84%**	**42%**

Risks from uncharacteristic wildfires to depressed bull trout populations would remain high for those alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high risk from uncharacteristic wildfire subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires would remain high across 78 to 84 percent of the depressed bull trout populations within the Ecogroup under Alternatives 4 and 6 due to the lack of potential treatments. This would be followed by Alternatives 1B, 2, 3, and 7 with 38 to 50 percent of the depressed bull trout populations still having a high risk from uncharacteristic wildfires and Alternative 5 with 20 percent still having a high risk from uncharacteristic wildfires. The Southwest Idaho and Salmon River Recovery Units would follow a similar pattern, with depressed bull trout populations having the highest risk from uncharacteristic wildfire under Alternatives 4 and 6 and the lowest risk under Alternative 5. Alternatives 1B and 5 in the Hells Canyon and Alternatives 1B and 6 in the Imnaha Recovery Units would have higher risks to depressed bull trout because of the potential for less fuel reduction treatments.

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations **-** There are thirty-seven subwatersheds are considered as strongholds for bull trout in the Ecogroup. Eight of these are at high risk from uncharacteristic wildfires. There are either no bull trout strongholds or no strongholds at risk from uncharacteristic wildfire in the Brownlee, Hells Canyon, Boise-Mores, Middle Fork Payette, North Fork Payette, South Fork Payette subbasins or any of the subbasins in the Salmon River Recovery Unit.

Based on MPC emphasis, treatments to reduce uncharacteristic wildfire risks in the eight bull trout strongholds could vary by alternative. All of the strongholds could be treated under Alternatives 3, 5 and 7; one third (33 percent) could be treated under Alternative 4; and no strongholds would be treated under Alternatives 1B, 2, and 6. Because high emphasis treatments occur in some of the last remaining strongholds (Payette, South Fork Boise, and North Fork/Middle Fork Boise subbasins) in Southwest Idaho recovery unit, management activities may pose a greater risk to bull trout than if an uncharacteristic wildfire occurred for Alternatives 3, 4, 5, and 6. Management direction for the action alternatives would help to minimize many management effects (see Direct and Indirect Effects Common to all Alternatives). However, there would still be some risk of impacts to stronghold subwatersheds in each alternative from roads and mechanical/fire treatments.

Table SW-69. Percent of Stronghold Bull Trout Subwatersheds Where Risks from Management Treatments for Uncharacteristic Wildfires Would Be Higher within Subbasins* within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
SW Idaho Recovery Unit							
North and Middle Fork Boise	0%	0%	100%	0%	100%	0%	100%
Payette	0%	0%	100%	100%	100%	0%	100%
South Fork Boise River	0%	0%	100%	0%	100%	0%	100%
Entire Recovery Unit	**0%**	**0%**	**100%**	**33%**	**100%**	**0%**	**100%**

*The other subbasins in this ESU do not have any bull trout strongholds.

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis** - All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. Alternatives 3, 2, and 7 have MPCs that emphasize the most appropriate restoration and conservation in 61, 59, and 59 percent, respectively, of the high priority subwatersheds identified by the WARS (Table SW-70). Under these alternatives the North Fork and Middle Fork Boise, Upper Salmon, South Fork Salmon, Lower Middle Fork Salmon and Upper Middle Fork Salmon have the best potential to see timely aquatic restoration given their MPCs and number of ACS priority subwatersheds.

The Salmon River Recovery Unit under Alternatives 2, 3, and 7, Hell Canyon Recovery Unit under Alternatives 3 and 4, and Southwest Idaho Recovery Unit under Alternative 4 would potentially see appropriate restoration or conservation with the fastest recovery rate in high priority subwatersheds identified by the WARS. The Imnaha Recovery Unit would potentially see very little aquatic restoration under any alternative in the short term.

Forest-wide and Management Area restoration emphasis under the action alternatives, coupled with protective management direction, should make great strides in reducing existing impacts and improving watershed and habitat conditions. Effects from roads, degraded riparian, poor habitat access, and unstable stream channels should decrease as restoration is implemented. Restoration would slowly reduce the number of water quality limited streams and damaged stream segments identified in the environmental baselines.

Table SW-70. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	0%	0%	67%	100%	0%	0%	0%
Imnaha Recovery Unit							
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
SW Idaho Recovery Unit							
Boise-Mores	50%	50%	0%	50%	50%	50%	50%
Middle Fork Payette	8%	17%	17%	17%	8%	17%	17%
North and Middle Fork Boise	60%	60%	70%	80%	40%	60%	60%
North Fork Payette	15%	15%	62%	46%	8%	15%	31%
Payette	0%	0%	0%	100%	0%	0%	0%
South Fork Boise River	0%	0%	0%	8%	0%	0%	25%
South Fork Payette	44%	44%	44%	67%	11%	44%	67%
Weiser River	17%	17%	17%	100%	0%	17%	17%
Entire Recovery Unit	23%	24%	33%	48%	12%	24%	35%
Salmon River Recovery Unit							
Little Salmon River	42%	75%	67%	50%	17%	67%	42%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Middle Salmon-Chamberlain	56%	56%	49%	61%	49%	59%	61%
South Fork Salmon	30%	64%	66%	34%	25%	43%	67%
Upper Middle Fork Salmon	50%	83%	83%	83%	33%	83%	75%
Upper Salmon	18%	78%	85%	18%	15%	58%	73%
Entire Recovery Unit	43%	71%	70%	48%	34%	59%	68%
All Recovery Units	**37%**	**59%**	**61%**	**48%**	**29%**	**50%**	**59%**

Not all subbasins under Alternatives 2, 3, and 7, however, have MPCs with the same restoration emphasis as WARS. In the Lower Salmon, Little Salmon, Middle Fork Payette, North Fork Payette, Payette, South Fork Boise, Weiser, and Hells Canyon subbasins, 42 percent or less of the high priority subwatersheds would receive the appropriate restoration and conservation recommended by WARS. Some of these areas, however, fall within ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or trend toward recovery. Yet, some areas that do not fall within ACS priority subwatersheds may continue to see localized effects to water quality, channel condition, watershed condition, and flow/hydrology pathways where problem sites are not addressed in the short term.

Alternatives 1B, 4, 5, and 6 have MPCs that emphasize the appropriate restoration and conservation in 50 percent or less of the high priority subwatersheds identified by the WARS. Under these alternatives the Lower Middle Fork Salmon, Middle Salmon-Chamberlain, Boise-Mores, North Fork and Middle Fork Boise, and South Fork Payette subbasins have the potential for the most expedient aquatic restoration. Although management direction would help reduce effects, aquatic restoration in many subbasins may not be as aggressively pursued under these alternatives. Delays in restoration may also delay habitat improvements in the short term. This could place already depressed bull trout populations at greater risk in portions of each subbasin.

Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations - Alternatives 2, 3, and 7 have MPCs that emphasize the appropriate restoration or conservation recommended by the WARS to more subwatersheds containing depressed bull trout populations (Tables SW-71) than other alternatives. Alternatives 7, 2, 3, 4, and 6 have MPCs that emphasize the appropriate restoration or conservation recommended by the WARS to more subwatersheds containing stronghold bull trout populations than other alternatives. There are no bull trout strongholds in the Brownlee, Hells Canyon, Middle Fork Payette, North Fork Payette, Weiser, Lower Middle Fork Salmon, Lower Salmon and Middle-Salmon Chamberlain subbasins to assess for restoration.

Table SW-71. Percent of Bull Trout Strongholds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins* in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
SW Idaho Recovery Unit							
Boise-Mores	100%	100%	0%	100%	100%	100%	100%
North and Middle Fork Boise	33%	67%	67%	67%	50%	67%	67%
Payette	0%	0%	0%	100%	0%	0%	0%
South Fork Boise River	0%	0%	0%	0%	0%	0%	25%
South Fork Payette	43%	43%	43%	57%	14%	43%	71%
Entire Recovery Unit	32%	42%	37%	53%	26%	42%	58%
Salmon River Recovery Unit							
Little Salmon River	60%	100%	100%	80%	40%	80%	60%
South Fork Salmon	0%	100%	100%	0%	100%	0%	100%
Upper Middle Fork Salmon	75%	100%	100%	100%	25%	100%	100%
Upper Salmon	60%	60%	60%	60%	60%	60%	60%
Entire Recovery Unit	56%	87%	87%	67%	50%	67%	73%
All Recovery Units	**41%**	**62%**	**59%**	**59%**	**35%**	**53%**	**65%**

*The other subbasins in this ESU do not have any bull trout strongholds.

Alternatives 2, 3, and 7 have the most potential to initiate habitat and watershed improvements in 53 percent or more of the stronghold bull trout populations (Table SW-71) and 60 percent or more of the depressed bull trout populations (Table SW-72). Most subbasins in the Ecogroup with bull trout populations would see improved habitat and watershed conditions as restoration is implemented. In contrast, Alternatives 1B and 5 have the least potential to initiate habitat and watershed improvements in subbasins with stronghold bull trout populations, and Alternatives 1B, 4, 5, and 6 have the least potential in subbasins with depressed bull trout populations.

Most restoration and conservation would take place in the Salmon River Recovery unit for depressed and stronghold bull trout populations (Tables SW-71 and SW-72). Restoration and conservation should help to reduce existing impacts and improving watershed/habitat conditions for bull trout in a portion of the Southwest Idaho recovery unit (South Fork Payette, Boise-Mores, North Fork/Middle Fork Boise).

Table SW-72. Percent of Depressed Bull Trout Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	0%	0%	60%	100%	0%	0%	0%
Imnaha Recovery Unit							
Hells Canyon	0%	0%	0%	0%	0%	0%	0%
SW Idaho Recovery Unit							
Boise-Mores	0%	0%	0%	0%	0%	0%	0%
Middle Fork Payette	33%	33%	33%	33%	33%	33%	33%
North and Middle Fork Boise	50%	50%	75%	100%	25%	50%	50%
North Fork Payette	17%	17%	67%	67%	0%	17%	17%
Payette	0%	0%	0%	100%	0%	0%	0%
South Fork Boise River	0%	0%	0%	14%	0%	0%	14%
South Fork Payette	50%	50%	50%	100%	0%	50%	50%
Weiser River	0%	0%	0%	100%	0%	0%	0%
Entire Recovery Unit	17%	17%	31%	62%	7%	17%	21%
Salmon River Recovery Unit							
Little Salmon River	33%	67%	33%	33%	0%	67%	33%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Middle Salmon-Chamberlain	56%	56%	49%	61%	49%	59%	61%
South Fork Salmon	31%	63%	64%	36%	23%	44%	66%
Upper Middle Fork Salmon	38%	75%	75%	75%	25%	75%	63%
Upper Salmon	13%	81%	87%	13%	10%	55%	74%
Entire Recovery Unit	68%	70%	68%	48%	35%	58%	68%
All Recovery Units	**39%**	**63%**	**62%**	**50%**	**30%**	**51%**	**60%**

Effects from past management activities in other subbasins (Weiser, Middle Fork Payette, North Fork Payette, Payette, and South Fork Boise) in the Southwest Idaho recovery unit may persist in the short term because WARS recommends active restoration, but MPCs prescribe either passive restoration, conservation, or a moderate restoration priority. It is assumed that where MPCs have a low to moderate aquatic restoration emphasis, aquatic restoration would not be as aggressively pursued. This could place already depressed bull trout populations in a number of subbasins at greater risk from increased sediment, fragmented habitat, and unstable channels. The ACS designations in these subbasins, however, would emphasize aquatic restoration, allowing projects to better compete with other resources priorities. Where there is overlap with ACS priority subwatersheds, habitat conditions should either be maintained or slowly trend toward recovery.

In the Imnaha-Snake and Hell Canyon Recovery Units, most alternatives do not provide the appropriate restoration and conservation MPCs to high priority subwatersheds identified by the WARS. As described previously, it is assumed that aquatic restoration would not be as great an emphasis in these subwatersheds. This could place already depressed and fragmented bull trout populations in these two recovery units at greater risk from continued sediment, fragmented habitat, and unstable channels. Several populations in the Hells Canyon Recovery Unit (Brownlee Reservoir) also occur as isolated local populations, making them more susceptible to management activities and degraded baselines. Several ACS priority subwatersheds in these recovery units have been designated. This designation will make restoration activities a higher priority and establishes restoration objectives in these areas. Habitat conditions should either be maintained or slowly trend toward recovery. These conditions may or may not be enough to reverse the trend of depressed populations or minimize all effects.

Issue 4, Indicator 5: Effects From Motorized Trail Use - Trails currently open to motorized use would be prohibited within proposed wildernesses under Alternatives 4 and 6. Under Alternative 4, in the Salmon River Recovery Unit, the South Fork Salmon, Little Salmon, Lower Salmon, and Upper Salmon would see the most closures. Under Alternative 6, the South Fork Salmon and Upper Salmon would see the most closures. Under Alternative 4, in the Southwest Idaho Recovery Unit, the South Fork Boise, South Fork Payette, and Middle Fork Payette subbasins would see the most closures. Under Alternative 6, the South Fork and North Fork Payette subbasins would see the most closures. Only a few motorized trails would remain open in the Middle Fork and South Fork Payette subbasins. Most of these trails are outside of RCAs, so only localized effects to bull trout and their habitat would be anticipated. Motorized trails outside of recommended wilderness areas are more extensive in the South Fork Boise subbasin.

The Imnaha Recovery Unit would see minimal closures under Alternative 4 and no closures under Alternative 6. Finally, the Hells Canyon Recovery Unit would see the most closures under Alternative 4 and no closures under Alternative 6.

Trail closures could result in more concentrated use on remaining motorized trails. Subbasins with more motorized trails in RCA potentially could also see more impacts to bull trout and their habitat. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use.

All motorized trails would remain open under remaining alternatives. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects on Bull Trout

Non-Federal actions are likely to continue affecting listed species. The greatest potential for cumulative effects from non-federal activities would occur in the Imnaha-Snake River and Southwest Idaho recovery units. In these recovery units, non-federal lands comprise 40 percent or more of the acres in the action area. Subbasins with the highest potential for non-federal cumulative effects include the Payette, North Fork Payette, Weiser, and Brownlee Reservoir. As described in the effects common to all subbasins and in the subbasin analyses, degradation and loss of bull trout habitat from non-federal actions would continue. Degraded baseline conditions, and threats from brook trout hybridization and competition also would continue to stress bull trout populations in most subbasins. These effects, again, would be most severe on non-federal lands.

Effects to bull trout from non-federal lands would be lower overall in the Salmon River because non-federal lands comprise only 10 percent of the recovery unit. However, cumulative effects from non-federal lands would be high in individual subbasins such as the Lemhi, Little Salmon and Lower Salmon.

The level of risk associated with cumulative effects was evaluated for each subbasin by recovery unit within the Ecogroup. Alternatives 3, 5, and 7 would have a slightly higher risk of cumulative effects based on greater management and less aquatic restoration, than the other alternatives in the Southwest Idaho Recovery Unit (Table SW-73). In particular, the North Fork and Middle Fork Payette, Payette, and South Fork Payette subbasins could see more cumulative effects under these alternatives. In the Salmon River Recovery Unit, Alternatives 1B and 5 has a slightly higher cumulative effects risk. Specifically the Lower Salmon and Little Salmon could see higher risks due to grazing with less restrictive management direction, combined with degraded baselines.

Table SW-73. Relative Risks* from Cumulative Effects within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon Recovery Unit							
Brownlee Reservoir	10	10	8	7	10	10	10
Imnaha Recovery Unit							
Hells Canyon	10	10	8	8	8	8	8
SW Idaho Recovery Unit							
Boise-Mores	10	10	11	10	10	10	10
Middle Fork Payette	11	11	11	11	11	11	11
North and Middle Fork Boise	9	9	11	7	12	9	12
North Fork Payette	10	10	9	9	10	10	10
Payette	11	11	14	12	14	11	14
South Fork Boise River	10	10	13	10	13	10	13
South Fork Payette	7	7	7	6	8	7	6
Weiser River	11	11	11	8	11	11	11
Entire Recovery Unit	10	10	11	9	11	10	11
Salmon River Recovery Unit							
Little Salmon River	10	9	8	9	11	9	10
Lower Middle Fork Salmon	6	6	6	6	6	6	6
Lower Salmon	10	10	9	9	11	10	9
Middle Salmon-Chamberlain	7	7	7	7	7	7	7
South Fork Salmon	7	7	7	7	7	7	6
Upper Middle Fork Salmon	10	6	6	6	8	6	6
Upper Salmon	8	6	8	8	8	7	6
Entire Recovery Unit	8	7	7	7	8	7	7

*****Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

In the Hells Canyon Recovery Unit, Alternatives 1B, 2, 5, 6, and 7 could see higher cumulative effects risk due to grazing with less restrictive management direction, little to no aquatic restoration, and degraded baselines. Finally in the Imnaha Recovery Unit, Alternatives 1B and 2 could see higher cumulative effects risk due to little aquatic restoration and ERT acres above the 100 percent TOC.

Viability Analysis for Bull Trout

Projected trends for bull trout over the first 15 years show that the number of stronghold subpopulations would remain unchanged. This is because it will take time for populations to respond to restoration and passive/conservation measures. The number depressed populations would change slightly (Table SW-74) for those alternatives that have active restoration MPCs within currently absent, but "linked" subwatersheds. It is assumed in these subwatersheds that fish habitat functioning at unacceptable risk is due to poor Geomorphic and/or Water Quality Integrity. Active restoration could begin to improve these limiting factors in 15 years so that fish could re-colonize from adjacent areas. Large numbers of fish would not be expected to re-colonize each subwatershed initially. Thus, these recolonized subwatersheds would at first be depressed, increasing the number of depressed subpopulations in the first 15 years. Restoration again would not improve enough of the overall subwatershed condition to trend existing depressed populations to strong ones in 15 years.

The Salmon River Recovery Unit would see the most potential for re-colonization under Alternatives 2, 3, and 7 in the Upper Salmon subbasin. The Southwest Idaho Recovery Unit would see the most re-colonization under Alternatives 4 and 7 in the Weiser and South Fork Payette subbasins. Re-colonization would not likely occur in the Hells Canyon or Imnaha Units.

Table SW-74. Number of Stronghold and Depressed Bull Trout Subwatersheds at 15 Years within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Hells Canyon Recovery Unit																
Brownlee Reservoir	0	6	0	6	0	6	0	6	0	10	0	6	0	6	0	6
Imnaha Recovery Unit																
Hells Canyon	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3
SW Idaho Recovery Unit																
Boise-Mores	1	3	1	3	1	3	1	3	1	4	1	3	1	3	1	3
Middle Fork Payette	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3
North and M. Fork Boise	6	13	6	13	6	13	6	13	6	14	6	13	6	13	6	13
North Fork Payette	0	5	0	5	0	5	0	6	0	6	0	6	0	5	0	6
Payette	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
South Fork Boise River	4	21	4	21	4	21	4	21	4	24	4	21	4	21	4	22
South Fork Payette	7	16	7	16	7	17	7	17	7	16	7	16	7	16	7	17
Weiser River	0	8	0	8	0	8	0	8	0	13	0	9	0	8	0	8
Entire Recovery Unit	19	71	19	71	19	72	19	73	19	82	19	73	19	71	19	74
Salmon River Recovery Unit																
Little Salmon River	6	10	6	10	6	12	6	12	6	10	6	10	6	12	6	10
Lower M.F. Salmon	0	28	0	28	0	28	0	28	0	28	0	28	0	28	0	28

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Lower Salmon	0	11	0	11	0	11	0	12	0	11	0	11	0	11	0	11
Middle Salmon-Chamberlain	0	49	0	49	0	49	0	49	0	49	0	49	0	49	0	49
South Fork Salmon	2	66	2	66	2	66	2	66	2	66	2	66	2	66	2	66
Upper M.F. Salmon	5	12	5	12	5	12	5	12	5	12	5	12	5	12	5	12
Upper Salmon	5	39	5	39	5	42	5	44	5	39	5	39	5	41	5	42
Entire Recovery Unit	18	215	18	215	18	220	18	223	18	215	18	215	18	219	18	218
All Recovery Units	**37**	**295**	**37**	**295**	**37**	**301**	**37**	**305**	**37**	**310**	**37**	**297**	**37**	**299**	**37**	**301**

S = Stronghold Subpopulations; D = Depressed Subpopulations

Projected trends over the long term indicate a positive trend from current conditions for stronghold populations under all alternatives. These predictions are based upon populations responding favorably to active and passive restoration and conservation measures. However, these predictions do not reflect changes in migration corridor survival from downstream influences, non-native species, harvest trends, etc. It is assumed that the temporary and short-term effects from Ecogroup activities would not compromise the benefits of restoration and conservation due to new and existing management direction. For all recovery units, Alternatives 3, 2, 7, and 4 show the greatest increase in the number of stronghold populations due to having more MPCs that emphasize the appropriate restoration and conservation within high priority subwatersheds identified by the WARS (Table SW-75).

In 50 years, under Alternatives 2, 3, 4, and 7, bull trout populations are predicted to improve from 37 strong population subwatersheds up to a range of 143 (Alt. 6) to 160 (Alt. 4). Some of the largest increases would occur in the Upper Salmon, Upper and Lower Middle Forks of the Salmon River, Middle Salmon-Chamberlain and South Fork Payette subbasins under these alternatives (Table SW-75). Alternatives 1B and 3 would have slightly smaller increases from 37 up to 137 stronghold subwatersheds, and Alternatives 5 would have the smallest increase (113) in stronghold subwatersheds. The number of depressed bull trout populations may also continue to increase as more "linked" subwatersheds are re-colonized. The re-colonization of subwatersheds will be an important indicator for this MIS species.

Table SW-75. Number of Stronghold and Depressed Bull Trout Subwatersheds at 50 Years within Subbasins in Bull Trout Recovery Units, by Alternative

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Hells Canyon Recovery Unit																
Brownlee Reservoir	0	6	0	6	0	6	0	6	4	6	0	6	0	6	0	6
Imnaha Recovery Unit																
Hells Canyon	0	3	0	3	0	3	0	3	1	2	0	3	0	3	0	3
SW Idaho Recovery Unit																
Boise-Mores	1	3	1	3	1	3	2	2	5	3	1	3	1	3	1	3
Middle Fork Payette	0	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2
N. and M. Fork Boise	6	13	8	11	8	11	7	12	9	11	7	12	8	11	9	10
North Fork Payette	0	5	1	4	1	4	2	4	2	4	1	5	1	4	2	4

Payette	1	2	1	2	1	2	1	2	2	1	1	2	1	2	1	2
South Fork Boise River	4	21	4	21	6	19	6	19	11	17	4	21	4	21	6	20
South Fork Payette	7	16	12	11	14	10	15	9	15	8	11	12	14	9	15	9
Weiser River	0	8	1	7	1	7	1	7	6	7	1	8	1	7	1	7
Entire Recovery Unit	19	71	29	61	33	58	35	59	51	53	27	67	31	59	36	57
Salmon River Recovery Unit																
Little Salmon River	6	10	8	8	10	8	8	10	8	8	6	10	10	8	7	9
Lower M.F. Salmon	0	28	26	2	26	2	26	2	26	2	25	3	26	2	26	2
Lower Salmon	0	11	3	8	3	8	1	11	3	8	0	11	3	8	3	8
Middle Salmon-Chamberlain	0	49	25	24	25	24	22	27	26	23	22	27	26	23	25	24
South Fork Salmon	2	66	23	45	27	41	22	46	23	45	18	50	25	43	25	43
Upper M.F. Salmon	5	12	8	9	8	9	7	10	9	8	7	10	9	8	9	8
Upper Salmon	5	39	9	35	14	33	16	33	9	35	8	36	13	33	12	33
Entire Recovery Unit	18	215	100	132	111	126	101	139	103	129	84	148	110	126	105	128
All Recovery Units	**37**	**295**	**131**	**201**	**146**	**192**	**137**	**205**	**160**	**190**	**113**	**221**	**143**	**195**	**143**	**193**

S = Stronghold Subpopulations; D = Depressed Subpopulations

Under Alternative 7, much of the predicted increases would occur in the Salmon River Recovery Unit. In the Southwest Idaho Recovery Unit bull trout would see the most potential increase in the North Fork/Middle Fork Boise and South Fork Payette subbasins, with other subbasins showing little to no change in the number of strong populations. Adjacent subbasins to the North Fork/Middle Fork Boise and South Fork Payette subbasins would likely see limited straying and recolonization of bull trout. This is because bull trout would have to migrate through high water temperatures and degraded habitat conditions. But the most serious impediment would be from the Lucky Peak, Arrowrock, and Deadwood dams. These dams would continue to keep populations isolated reducing genetic diversity. There would be no change in bull trout status in the Imnaha-Snake or Hells Canyon recovery units under Alternative 7.

The predicted increase in strongholds is a result of the greater restoration emphasis, adjustments to grazing and vegetation management, and protection provided by management direction for all action alternatives. As more subwatersheds support strong subpopulations, population risks should decrease. In particular, restoration should improve density-dependent (e.g., sex ratios, etc.) and genetic diversity factors. Restoration and conservation should also increase the availability of high quality habitats, thereby decreasing the chances that a large random disturbance event, such as wildfire, would reduce the effectiveness of available habitat. Many of the remaining strongholds for bull trout are clustered in only a few subwatersheds in one subbasin and are at high risk from disturbances. Stronger populations should result in more dispersed and resilient metapopulations across each subbasin. Bull trout populations in larger, less isolated, and less disturbed habitats may be more likely to persist, and these habitats may prove critical in terms of providing long-term refugia and re-colonization potential (Rieman and McIntyre 1995). The change in spatial pattern and population size over time will be an important way to determine the success of restoration efforts and minimization of project effects for this MIS species.

Based upon the predicted viability outcomes, all alternatives appear to improve the chances of recovery over time, by decreasing depressed and increasing stronghold populations. For any given year, subpopulations may respond positively or negatively to environmental factors; however, the metapopulations are expected to persist and their constituent subpopulations expand in distribution through the restoration of habitat and connectivity. While no alternative by itself would ensure recovery or de-listing due to the multitude of cumulative influences involved, those alternatives that have the potential for a faster rate of aquatic restoration would more quickly reduce effects on spawning and rearing habitat. Aquatic restoration, coupled with other management changes, could make great strides in increasing the overall viability of subpopulations in the Ecogroup area. However, for the predicted increases to be realized, restoration must be funded and implemented with the appropriate prioritization, and improvement to the downstream survival must also occur. Rehabilitation of depressed populations cannot be accomplished via habitat improvements alone, but would require improvements in migration corridor survival (Marmorek et al. 1998) and efforts to address causes of mortality in other life stages (Quigley and Arbelbide 1997).

Effects on Native Westslope Cutthroat Trout, A Region 4 Sensitive Species – Issue 4

Direct and Indirect Effects on Native Westslope Cutthroat Trout

Issue 4, **Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use**

Suited Timberland Acres – Based on suited timberland acres assigned by MPCs, Alternatives 5 and 1B have the greatest potential (926,154 and 496,164 acres) for impacts from commercial timber harvest and associated road activities. This is followed by Alternatives 2, 3, and 7 which have a moderate potential and Alternatives 4 and 6 a low potential for timber harvest and associated road activities (Table SW-76). Alternatives that have more acres available for commercial harvest and associated road activities have a higher potential for temporary and short-term impacts to previously identified matrix pathways (water quality, habitat condition, etc.) and to westslope cutthroat. In particular, the South Fork Salmon and Upper Salmon subbasins could see a greater risk of impacts under Alternatives 1B and 5 than other alternatives that propose far less suited timberland acres. Alternative 7 would have far less suited timberland acres than Alternative 1B, No Action, with the greatest differences occurring in the Lower Salmon, Middle Salmon-Chamberlain, Upper Salmon, South Fork Salmon, and Lower and Upper Middle Forks of the Salmon River subbasins.

Table SW-76. Acres of Suited Timber Base within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	55,551	45,737	39,749	0	106,844	34799	49,374
Lower Middle Fork Salmon	733	0	0	0	12,359	0	0
Lower Salmon	14,321	4,040	15,650	0	65,907	3705	7,965
Middle Salmon-Chamberlain	42,602	46,708	69,053	0	89,132	10284	18,885
South Fork Salmon	225,154	10,939	10,415	0	393,402	2655	20,836
Upper Middle Fork Salmon	44,360	0	0	0	79,965	0	0
Upper Salmon	113,446	1,021	1,018	0	178,545	0	1,018
All Subbasins	496,164	108,445	135,885	0	926,154	51,443	98,078

Westslope cutthroat occur in the Hells Canyon subbasin, but are not present within tributary streams on lands managed by the Payette National Forest. Therefore, effects from timber harvest and other resource activities will not be assessed for this subbasin.

ERT Acres Compared to Subbasin TOCs **-** Most alternatives have ERT acres between 24 to 91 percent of the TOC for each subbasin in the first 20 years (Table SW-77). Shaded boxes in the table indicate alternatives and subbasins where the TOC could be exceeded based on MPC modeling assumptions. Actual treatment acres would depend on site-specific proposals, analysis, consultation, and mitigation, which would no doubt modify the numbers presented below.

Table SW-77. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins that Support Westslope Cutthroat Trout, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Little Salmon River	58	45	43	30	32	20	29	18	51	38	42	26	44	33
Lower M. F. Salmon	40	39	36	27	28	16	31	15	48	36	32	21	51	39
Lower Salmon	77	52	62	42	34	30	51	31	64	52	91	52	52	41
Middle Salmon-Chamberlain	61	45	33	29	24	18	32	23	57	44	82	46	46	36
South Fork Salmon	72	56	66	43	44	33	35	25	63	50	52	33	78	53
Upper M. F. Salmon	112	90	61	46	55	37	50	31	61	51	61	38	90	66
Upper Salmon	42	26	120	70	85	50	69	52	42	36	62	38	125	75

Only the Upper Middle Fork Salmon and Upper Salmon River subbasins have ERT acres above 100 percent in select alternatives. Many of the higher TOCs are due to potential management activities to reduce wildfire risks and move vegetation toward desired conditions using fire reintroduction and mechanical thinning. Because the modeled ERT value exceeds the threshold of concern, the potential effects to westslope cutthroat and its habitat could be high in the short term in Upper Middle Fork Salmon in Alternative 1B and Upper Salmon in Alternatives 2 and 7. Remaining effects (see Effects Common to All Alternatives, General Effects) to water quality, watershed condition, and flow/hydrology could occur depending on the intensity of activities proposed in each alternative. Most of these affected pathways are also currently "functioning at risk", for the Upper Middle Fork Salmon and Upper Salmon subbasins. This suggests some subwatersheds may be more sensitive to proposed management actions.

Issue 4, Indicator 2: Effects From Livestock Grazing

Suitable Rangeland Acres – Suitable rangeland acres are slightly less under Alternatives 2, 3, 5 and 6 in the Westslope cutthroat trout subbasins than the current forest plans, represented by Alternative 1B (Table SW-78). Alternatives 4 and 7 are the same as 1B, or 4 percent suitable rangeland acres. Suitable rangeland acres are less than 10 percent in the majority of subbasins. Only the Little and Lower Salmon subbasins consistently have a higher potential for grazing impacts due to a higher amount of suitable acres (19 percent).

Table SW-78. Percent of Suitable Rangeland within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	19%	19%	19%	19%	19%	19%	19%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Lower Salmon	19%	19%	19%	19%	19%	19%	19%
Middle Salmon-Chamberlain	1%	1%	1%	1%	1%	1%	1%
South Fork Salmon	2%	2%	2%	2%	2%	2%	2%
Upper Middle Fork Salmon	1%	5%	5%	1%	5%	5%	1%
Upper Salmon	8%	8%	8%	8%	8%	8%	8%
All Subbasins	**4%**	**5%**	**5%**	**4%**	**5%**	**5%**	**4%**

Less Restrictive vs. More Restrictive Grazing Management - MPC emphasis and management direction also needs to be considered in addition to suited rangeland acres. Those alternatives and subbasins with a higher amount of suited rangeland acres and MPCs with less restrictive grazing direction have a greater potential for temporary and short-term effects to matrix pathways. In the Lower Salmon subbasin, Alternatives 1B, 2, 5, and 6 could allow more potential grazing impacts because they have less restrictive grazing strategies than Alternatives 3, 4, and 7 (Table SW-79). In the Little Salmon subbasin, Alternatives 1B, 2, 5, 6, and 7 could have more impacts due to a higher percentage of less restrictive grazing strategies than Alternatives 3 and 4.

Most matrix pathways in the Little Salmon subbasin are currently "functioning at risk" (refer to Environmental Baseline in Current Conditions). This suggests that this subbasin may be more sensitive to grazing activities and effects. Alternatives that would have the most restrictive grazing strategies in this subbasin are, in descending order: 4, 3, 7, 5, 2, 6, and 1B.

Overall, grazing management strategies would change significantly from the current forest plans in Alternatives 2, 3, 4, and 7, from 15 percent to 53 percent or more with more restrictive grazing strategies (Table SW-4). The Lower Salmon, South Fork Salmon, Middle Salmon-Chamberlain, Upper Middle Fork Salmon, and Upper Salmon subbasins would see the greatest change in MPC grazing strategies from the current forest plans, represented by Alternative 1B. The change in management strategies would help reduce effects and achieve TEPC fish and SWRA resource objectives. In the Hells Canyon, Lower Middle Fork Salmon, and Middle Salmon-Chamberlain subbasins, the potential effects from grazing to westslope cutthroat trout and their habitat would be low due to the low suitable rangeland acres.

Table SW-79. Percent of Less and More Restrictive Grazing Strategies within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Little Salmon River	97	3	88	12	49	51	18	82	84	16	89	11	58	42
Lower M. F. Salmon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lower Salmon	97	3	74	26	17	83	0	100	97	3	94	6	11	89
Middle Salmon-Chamberlain	100	0	100	0	93	7	0	100	100	0	100	0	2	98
South Fork Salmon	79	21	40	60	1	99	0	100	85	15	62	38	8	92
Upper M. F. Salmon	88	12	18	82	0	100	0	100	100	0	53	47	0	100
Upper Salmon	78	22	10	90	1	99	16	84	100	0	42	58	1	99
All Subbasins	**85**	**15**	**47**	**53**	**17**	**83**	**12**	**88**	**93**	**7**	**66**	**34**	**23**	**77**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Issue 4, Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard
Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations **–** The Hells Canyon, Lower Salmon, Upper Salmon, and Upper Middle Fork Salmon subbasins do not have any subwatersheds at high risk from uncharacteristic wildfire. The remaining four subbasins do have high-risk subwatersheds, and 35 of those subwatersheds have depressed westslope cutthroat trout populations (Table SW-80).

Table SW-80. Percent of Depressed Westslope Cutthroat Subwatersheds Where Risks From Uncharacteristic Wildfires Could be Reduced within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	33%	67%	100%	0%	100%	67%	0%
Lower Middle Fork Salmon	0%	0%	0%	0%	0%	0%	0%
Middle Salmon-Chamberlain	33%	33%	33%	0%	33%	67%	67%
South Fork Salmon	50%	32%	36%	4%	71%	7%	43%
All Subbasins	**46%**	**34%**	**40%**	**3%**	**69%**	**17%**	**40%**

Each alternative assigns MPCs that aggressively treat vegetation to reduce fuel loading. Alternatives 1B and 5 are the most aggressive, potentially treating more than 46 percent of all subwatersheds where depressed westslope cutthroat populations occur within the Ecogroup. In the Little Salmon River subbasin, under Alternative 5, all subwatersheds with depressed populations could see treatment. Alternatives 2, 3, and 7 potentially could treat 34 to 40 percent of the subwatersheds with depressed westslope cutthroat populations, with 100 percent potentially being treated in the Little Salmon River Subbasin under Alternative 3. Alternatives 4 and 6 would treat the least amount (5 to 13 percent) of subwatersheds with depressed westslope cutthroat populations.

Table SW-81. Percent of Depressed Westslope Cutthroat Subwatersheds Where Risks From Uncharacteristic Wildfires Would Remain High within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	67%	33%	0%	100%	0%	33%	100%
Lower Middle Fork Salmon	100%	100%	100%	100%	100%	100%	100%
Middle Salmon-Chamberlain	33%	67%	67%	100%	67%	33%	33%
South Fork Salmon	50%	78%	64%	96%	29%	93%	57%
All Subbasins	**54%**	**66%**	**60%**	**97%**	**31%**	**83%**	**60%**

Risks from uncharacteristic wildfires to depressed westslope cutthroat populations would remain high for whose alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high risk from uncharacteristic wildfire subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires would be remain high across 83 to 97 percent of the depressed westslope cutthroat populations within the Ecogroup under Alternatives 4 and 6 due to the lack of potential treatments. Alternatives 1B, 2, 3, and 7 could treat from 54 to 66 percent of the subwatersheds with depressed populations having a high risk from uncharacteristic wildfires, and Alternative 5 could treat 31 percent having a high risk from uncharacteristic wildfires.

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations - There are currently no stronghold subwatersheds with westslope cutthroat populations that are at high risk from uncharacteristic wildfires within the Ecogroup, so there would be no potential effects to this indicator under any alternative.

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis** - All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. Alternatives 2, 3, 7, and 6 have MPCs that emphasize the most appropriate restoration and conservation in 71, 70, 68, and 59 percent, respectively, of the high priority subwatersheds identified by the WARS (Table SW-82). Under these alternatives, the Upper Salmon, South Fork Salmon, Lower Middle Fork Salmon and Upper Middle Fork Salmon have the potential to see a faster rate of aquatic restoration given their MPCs and number of ACS priority subwatersheds. This restoration emphasis, coupled with more restrictive management direction, should make great strides in reducing existing impacts and improving watershed/habitat conditions. Effects from roads, degraded riparian, poor habitat access, and unstable stream channels should decrease as restoration is implemented.

Table SW-82. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	42%	75%	67%	50%	17%	67%	42%
Lower Middle Fork Salmon	93%	96%	96%	93%	89%	93%	96%
Lower Salmon	38%	63%	38%	38%	0%	38%	38%
Middle Salmon-Chamberlain	56%	56%	49%	61%	49%	59%	61%
South Fork Salmon	30%	64%	66%	34%	25%	43%	67%
Upper Middle Fork Salmon	18%	82%	82%	82%	18%	82%	73%
Upper Salmon	18%	78%	85%	18%	15%	58%	73%
All Subbasins	**43%**	**71%**	**70%**	**48%**	**34%**	**59%**	**68%**

Not all subbasins under these alternatives, however, have MPCs with the same restoration emphasis as the WARS. In the Lower Salmon and Little Salmon subbasins, less than half of the high priority subwatersheds have the restoration and conservation prescriptions recommended by WARS under Alternative 7. While, for the Lower Salmon subbasin, less than half of the high priority subwatersheds have the restoration and conservation prescriptions recommended by WARS under Alternative 3. Many of these areas, however, fall within ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or slowly trend toward recovery. Yet, some areas that do not fall within ACS priority subwatersheds may continue to see localized effects to water quality, channel condition, watershed condition, and flow/ hydrology pathways where problem sites are not addressed in the short term.

Alternatives 1B, 4, and 5 have MPCs that emphasize the appropriate restoration and conservation in little more than a third of the high priority subwatersheds identified by WARS in the Ecogroup in the ESU. Under these alternatives, the Lower Middle Fork Salmon and Middle Salmon-Chamberlain subbasins have the most potential for the timely aquatic restoration, based on MPCs alone. Although more restrictive management direction would help reduce effects, aquatic restoration in many subbasins would not be as aggressively pursued under these alternatives. Delays in restoration may also delay habitat improvements in the short term. These delays could place already depressed westslope cutthroat populations at greater risk in portions of each subbasin.

Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations - Stronghold westslope cutthroat populations only occur in three subwatersheds; Boundary Dagger in the Upper Middle Fork Salmon subbasin, and Yellow Belly Lake Creek and Champion Creek in the Upper Salmon subbasin. These populations have the potential to receive the same aquatic restoration emphasis under all alternatives (Table SW-83).

Alternatives 2, 3, 7, and 6 have MPCs that emphasize appropriate and timely restoration and conservation recommended by the WARS in more subwatersheds containing depressed westslope cutthroat populations than other alternatives (Table SW-84). These alternatives have the potential to initiate restoration of habitat and watershed conditions in 57 percent or more of the subwatersheds with depressed westslope cutthroat populations. Most subbasins in the Ecogroup area with westslope cutthroat populations would see improved habitat and watershed conditions as restoration is implemented. In contrast, Alternatives 1B, 4, and 5 have the potential to initiate habitat and watershed improvements in only 45 percent or less of the subbasins with depressed westslope cutthroat populations.

Table SW-83. Percent of Westslope Cutthroat Strongholds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Upper Middle Fork Salmon	100%	100%	100%	100%	100%	100%	100%
Upper Salmon	50%	50%	50%	50%	50%	50%	50%
All Subbasins	**66%**	**66%**	**66%**	**66%**	**66%**	**66%**	**66%**

*The other subbasins do not have any westslope cutthroat trout strongholds.

Table SW-84. Percent of Depressed Westslope Cutthroat Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Native Westslope Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Little Salmon River	0%	60%	60%	0%	0%	60%	0%
Lower Middle Fork Salmon	92%	96%	96%	92%	88%	92%	96%
Lower Salmon	100%	100%	0%	100%	0%	100%	100%
Middle Salmon-Chamberlain	37%	37%	37%	37%	37%	37%	37%
South Fork Salmon	29%	65%	65%	34%	25%	43%	68%
Upper Middle Fork Salmon	42%	75%	75%	75%	17%	75%	67%
Upper Salmon	20%	80%	84%	20%	16%	60%	72%
All Subbasins	**40%**	**70%**	**69%**	**45%**	**34%**	**57%**	**68%**

Issue 4, Indicator 5: Effects From Motorized Trail Use – Trails currently open to motorized use would have that use prohibited within recommended wildernesses under Alternatives 4 and 6. Under Alternative 4, the South Fork Salmon, Little Salmon, Lower Salmon, and Upper Salmon would see the most restrictions. Under Alternative 6, the South Fork Salmon and Upper Salmon would see the most restrictions. All motorized trails would remain open under the remaining alternatives. Trail restrictions in these subbasins could result in more concentrated use on remaining motorized trails. Subbasins with more motorized trails in RCA potentially could also see more impacts to westslope cutthroat and their habitat. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects on Native Westslope Cutthroat Trout

Non-federal actions are likely to continue affecting listed species. Effects to westslope cutthroat from non-federal lands would be low overall in the Salmon River Basin when compared to other areas in the Ecogroup. Non-federal lands comprise only 10 percent of the Salmon River Basin. However, cumulative effects from non-federal lands would be high in individual subbasins such as the Lemhi, Little Salmon and Lower Salmon. As described in the Cumulative Effects Common to all Alternatives, degradation and loss of habitat from non-federal actions would continue. Degraded baseline conditions, and threats from hatchery fish also would continue to stress populations in most subbasins.

The level of risk associated with cumulative effects was evaluated for each subbasin where westslope cutthroat occur within the Ecogroup. Alternatives 1B, 2, and 5 would have a slightly higher risk of cumulative effects based on greater timber, grazing, etc. management and less aquatic restoration, than the other alternatives (Table SW-85). In particular, the Little Salmon and Lower Salmon could see more cumulative effects under these alternatives. Remaining alternatives have slightly lower risk of cumulative effects than Alternatives 1B, 2, and 5. However, several subbasins still have a high risk of cumulative effects, - Specifically due to more grazing with less restrictive management direction in Lower Salmon, combined with degraded baselines. Under the Alternative 7, only the Little Salmon subbasin faces greater risk from cumulative effects due to more grazing with less restrictive management direction.

Table SW-85. Relative Risks* from Cumulative Effects within Subbasins that Support Native Westslope Cutthroat Trout in the Ecogroup, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hells Canyon	NA	NA	NA	NA	NA	NA	NA
Little Salmon River	10	9	8	9	11	9	10
Lower Middle Fork Salmon	6	6	6	6	6	6	6
Lower Salmon	10	10	9	9	11	10	9
Middle Salmon-Chamberlain	7	7	7	7	7	7	7
South Fork Salmon	7	7	7	7	7	7	6
Upper Middle Fork Salmon	10	6	6	6	8	6	6
Upper Salmon	8	8	6	8	8	7	8
All Subbasins	**8**	**8**	**7**	**7**	**8**	**7**	**7**

*****Relative risk rating based upon a maximum total of 15 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Native Westslope Cutthroat Trout

A viability analysis was not run for westslope cutthroat because the analysis for spring/summer chinook salmon, steelhead and bull trout was thought to adequately represent potential watershed condition changes for this species. Chinook, steelhead, and bull trout populations are all predicted to improve in 50 years under all alternatives because of the greater restoration emphasis and continued adjustments to grazing and recreation activities. Westslope cutthroat habitat would also be expected to improve. How much westslope cutthroat populations respond to this habitat improvement, however, is dependent upon downstream influences in each subbasin.

Effects on Native Wood River Sculpin, A Region 4 Sensitive Species – Issue 4

Direct and Indirect Effects on Wood River Sculpin

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use

Suited Timberland Acres – Based on suited timberland acres assigned by MPCs, Alternatives 1B and 5 have the greatest potential (126,998 and 193,946 acres) for impacts from commercial timber harvest and associated road activities. This is followed by Alternatives 2, 3, and 7 which have a moderate potential and Alternatives 4 and 6 a low potential for timber harvest and associated road activities (Table SW-86). Alternatives that have more acres available for commercial harvest and associated road activities have a higher potential for temporary and short-term impacts to previously identified matrix pathways (water quality, habitat condition, etc.) and to Wood River sculpin. In particular, Big Wood River subbasin could see a greater risk of impacts under Alternatives 1B and 5 than other alternatives that propose far less suited timberland acres. Alternative 7 would have far less suited timber base than Alternative 1B, with the greatest differences occurring in the Big Wood River subbasin.

Table SW-86. Acres of Suited Timber Base within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	104,505	29,492	57,942	0	155,744	2,360	31,779
Camas Creek	15,086	16,607	18,203	451	24,035	3,144	4,175
Little Wood River	7,407	6,935	6,735	0	14,167	1,394	6,735
All Subbasins	**126,998**	**53,034**	**82,880**	**451**	**193,946**	**6,898**	**42,689**

ERT Acres Compared to Subbasin TOCs - Most alternatives have ERT acres between 6 to 66 percent of the TOC for each subbasin in the first 20 years (Table SW-87). No subbasins have ERT acres above 100 percent for any alternative.

Table SW-87. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins that Support Wood River Sculpin, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Big Wood River	9	7	55	35	38	31	16	27	20	19	24	18	66	45
Camas Creek	9	13	11	14	8	7	9	26	15	16	19	18	30	28
Little Wood River	6	7	34	32	30	30	13	27	20	21	25	21	53	44

Issue 4, Indicator 2: Effects From Livestock Grazing
Suitable Rangeland Acres – Suitable rangeland acres are the same for all alternatives (23 percent of all subbasins), with the exception of Alternative 6, which is only 11 percent (Table SW-88). Suitable rangeland acres consistently range from 20 to 37 percent in the majority of subbasins and thus have a higher potential for grazing impacts than the acres for the listed species analyzed above.

Table SW-88. Percent of Suitable Rangeland within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	20%	20%	20%	19%	20%	4%	20%
Camas Creek	24%	24%	24%	24%	24%	24%	24%
Little Wood River	37%	37%	37%	37%	37%	37%	37%
All Subbasins	**23%**	**23%**	**23%**	**23%**	**23%**	**11%**	**23%**

Less Restrictive vs. More Restrictive Grazing Management - Overall, the percentage of more restrictive grazing management strategies for most action alternatives would change only slightly from the current forest plans (Alt. 1B), with the exception of Alternative 4 where more restrictive strategies increase by 53 percent, and Alternative 5 where more restrictive strategies decrease by 20 percent (Table SW-89). Only Alternative 4 would have a predominance of more restrictive grazing strategies, and this would only occur in the Big Wood and Little Wood subbasins.

Most matrix pathways in the Little Wood subbasin are currently "functioning at risk" (refer to Environmental Baseline in Current Conditions). This suggests that this subbasin may be more sensitive to grazing activities and effects. Alternatives that would have the most restrictive grazing strategies in this subbasin are, in descending order: 4, 3 and 7, 2, 1B, 6, and then 5.

Table SW-89. Percent of Less and More Restrictive Grazing Strategies within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Big Wood River	90	10	76	24	76	24	34	76	100	0	35	65	80	20
Camas Creek	100	0	100	0	100	0	61	39	100	0	100	0	100	0
Little Wood River	45	55	43	57	43	57	8	92	100	0	46	54	43	57
All Subbasins	**80**	**20**	**71**	**29**	**71**	**29**	**27**	**73**	**100**	**0**	**79**	**21**	**74**	**26**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Issue 4, Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard
Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations – Two of the three subbasins where Wood River sculpin occur have subwatersheds at high risk from uncharacteristic wildfires, Big Wood and Little Wood River. These subbasins have 14 subwatersheds with depressed populations at high risk (Table SW-90). Each alternative assigns

MPCs that would allow aggressive treatment to reduce fuel loading. Alternative 5 would be the most aggressive, potentially treating more than 100 percent of the subwatersheds where depressed sculpin populations occur within the Ecogroup. Alternatives 2, 3, and 7 potentially could treat 50 to 57 percent of the depressed sculpin populations within the Ecogroup. Alternatives 4 and 6 would treat the least amount (7 to 14 percent) of subwatersheds with depressed sculpin populations.

Table SW-90. Percent of Depressed Wood River Sculpin Subwatersheds Where Risks From Uncharacteristic Wildfires Could Be Reduced within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	45%	64%	73%	9%	100%	18%	73%
Little Wood River	0%	0%	0%	0%	0%	0%	0%
All Subbasins	**36%**	**50%**	**57%**	**7%**	**100%**	**14%**	**57%**

Table SW-91. Percent of Depressed Wood River Sculpin Subwatersheds Where Risks From Uncharacteristic Wildfires Would Remain High within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	55%	36%	27%	91%	0%	82%	27%
Little Wood River	100%	100%	100%	100%	0%	100%	100%
All Subbasins	**64%**	**50%**	**43%**	**93%**	**0%**	**86%**	**43%**

Risks from uncharacteristic wildfires to depressed sculpin populations would remain high for those alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high-risk subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires would remain high across 86 to 93 percent of the depressed sculpin populations within the Ecogroup under Alternatives 4 and 6 due to the lack of potential treatments. Alternatives 1B, 2, 3, and 7 could treat from 43 to 73 percent of the high-risk subwatersheds with depressed sculpin populations, and Alternative 5 could treat up to 100 percent of the high-risk subwatersheds.

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations - There are currently no subwatersheds with strong sculpin populations within the Ecogroup, so there would be no potential effects to this indicator under any alternative.

Issue 4, Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis - All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. No alternative has MPCs that emphasize the appropriate restoration or conservation strategy to high priority subwatersheds identified by the WARS in subbasins that contain Wood River sculpin (Table SW-92). This is because WARs recommends active restoration in many subwatersheds, but under the action alternatives, 4.1c MPCs emphasize passive restoration in much of Camas Creek and Big Wood River subbasins. Although the 4.1c provides a level of protection through passive and conservation practices, there would be little active restoration where depressed sculpin populations occur. Alternative 1B assigns 4.2 and 6.2 MPCs that have a moderate to low priority for active restoration.

Some subwatersheds within each subbasin fall within ACS priority subwatersheds. It is anticipated that the ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or slowly trend toward recovery. However, the majority of subbasins do not fall within ACS priority subwatersheds. Although more restrictive management direction would help reduce effects, and the 4.1c MPC limits many activities, aquatic restoration would not be as aggressively pursued where needed in non-ACS priority subwatersheds. Delays in restoration may delay habitat improvements in the short term. These delays could place some depressed sculpin populations at greater risk in portions of each subbasin.

Table SW-92. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	0%	0%	0%	0%	0%	0%	0%
Camas Creek	0%	0%	0%	0%	0%	0%	0%
Little Wood River	0%	0%	0%	0%	0%	0%	0%
All Subbasins	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations **-** There are no stronghold sculpin populations within the Ecogroup (Table SW-93). Depressed sculpin populations, however, occupy more than 50 subwatersheds for spawning and rearing. As described above, no alternative has MPCs that emphasize the appropriate restoration or conservation to high priority subwatersheds identified by the WARS in subbasins that contain Wood River sculpin.

Table SW-93. Percent of Depressed Wood River Sculpin Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Wood River Sculpin, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	0%	0%	0%	0%	0%	0%	0%
Camas Creek	0%	0%	0%	0%	0%	0%	0%
Little Wood River	0%	0%	0%	0%	0%	0%	0%
All Subbasins	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Issue 4, Indicator 5: Effects From Motorized Trail Use – Trails currently open to motorized use would have that use prohibited within recommended wildernesses under Alternatives 4 and 6. Under Alternative 4, the Big Wood would see the most restrictions, while under Alternative 6 the Little Wood would see the most closures. All motorized trails would remain open under remaining alternatives. Trail restrictions could result in more concentrated use on remaining motorized trails in or adjacent to these subbasins. Only a few motorized trails would remain open in the Big and Little Wood subbasins. Most of these trails are outside of RCAs, so only localized effects to sculpin and their habitat would be anticipated. Motorized trails outside of recommended wilderness areas are more extensive in the adjacent South Fork Boise and Camas Creek subbasins. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use, especially in adjacent subbasins. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects on Wood River Sculpin

Non-federal actions are likely to continue affecting listed species. Effects to sculpin from non-federal lands would be moderate in the Camas (39 percent) to high Little Wood (68 percent) subbasins. As described in the Cumulative Effects Common to all Alternatives section, degradation and loss of habitat from non-federal actions would continue. Degraded baseline conditions also would continue to stress populations in most subbasins.

The level of risk associated with cumulative effects was evaluated for each subbasin where sculpin occur within the Ecogroup. Alternatives 1B, 2, 3, 5, and 7 would have a slightly higher risk of cumulative effects based on greater timber, grazing, etc. management and less aquatic restoration, than the other alternatives (Table SW-94). In particular, the Camas Creek subbasin could see more cumulative effects due to more grazing with less restrictive management direction, less potential for aquatic restoration, high amount of non-federal ownership and degraded baselines.

Table SW-94. Relative Risks* from Cumulative Effects within Subbasins that Support Wood River Sculpin in the Ecogroup, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Big Wood River	10	10	10	9	10	8	10
Camas Creek	12	12	12	12	12	12	12
Little Wood River	10	10	10	10	11	10	10
All Subbasins	**11**	**11**	**11**	**10**	**11**	**10**	**11**

*****Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Wood River Sculpin

Wood River sculpin was not included in the viability analysis because it is a narrow endemic species, whose distribution is largely unknown. Furthermore, this species appears to be doing well in many of the streams where it occurs (Simpson and Wallace 1982). Wood River sculpin populations would be expected to improve as a result of more restrictive management direction and aquatic restoration.

How much sculpin populations respond to restoration, however, is largely dependent on downstream influences in each subbasin. Additional high quality habitat alone is no guarantee of increased persistence without a comprehensive approach that addresses all mortality factors acting upon the population (ICBEMP 1997a).

<u>Effects on Native Yellowstone Cutthroat Trout, A Species of Special Concern –Issue 4</u>

Direct and Indirect Effects on Native Yellowstone Cutthroat Trout

Issue 4, Indicator 1: Effects From Vegetation Treatments, Roads, and Fire Use

<u>*Suited Timberland Acres*</u> – Based on suited timberland acres assigned by MPCs, Alternatives 1B, 2, 3, 5 and 7 have the greatest potential (45,345 and 69,915 acres) for impacts from commercial timber harvest and associated road activities. Alternatives 4 and 6 would have a lower potential for impacts from timber harvest and associated road activities (Table SW-95). Alternatives that have more acres available for commercial harvest and associated road activities have a higher potential for temporary and short-term impacts to previously identified matrix pathways (water quality, habitat condition, etc.) and to westslope cutthroat. In particular, Raft River and Goose Creek subbasins could see a greater risk of impacts under Alternatives 1B, 2, 3, 5 and 7 than other alternatives that propose far less suited timberland acres. Alternative 7 would have a slightly lower suited timber base than Alternative 1B, with the greatest differences occurring in the Raft River subbasin.

Table SW-95. Acres of Suited Timber Base within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Goose Creek	18,148	15,286	15,244	4,365	20,816	1,511	14,875
Upper Snake-Rock	9,329	10,521	10,446	3,442	12,842	7,608	9,433
Raft River	27,338	26,107	26,006	7,452	36,257	2,724	21,037
All Subbasins	**54,815**	**51,914**	**51,696**	**15,259**	**69,915**	**12,226**	**45,345**

<u>*ERT Acres Compared to Subbasin TOCs*</u> **-** Most alternatives have ERT acres between 3 to 78 percent of the TOC for each subbasin in the first 20 years (Table SW-96).

Table SW-96. Percent of ERT Acres Relative to the Threshold of Concern (100) within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative, After 20 and 50 Years

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.	20 yrs.	50 yrs.
Goose Creek	59	42	20	29	10	6	25	46	78	46	59	30	107	92
Upper Snake-Rock	23	22	16	11	11	6	34	49	23	15	39	19	28	49
Raft River	21	25	8	11	3	11	18	28	44	29	31	21	27	32

Only the Goose Creek subbasin has ERT acres above 100 percent under Alternative 7 (Table SW-96). Many of the higher ERT acres are due to potential management activities to reduce wildfire risks and move vegetation toward desired conditions using fire reintroduction and mechanical thinning. Because the modeled ERT value exceeds the threshold of concern, the potential effects to Yellowstone cutthroat and its habitat could be high in the short term in Goose Creek in Alternative 7. Remaining threats (see Effects Common to All Alternatives, General Effects) to water quality, watershed condition, and flow/hydrology could occur depending on the intensity of activities proposed. Most of these affected pathways are also currently "functioning at unacceptable risk". This suggests some subwatersheds in Goose Creek may be more sensitive to proposed management actions.

Issue 4, Indicator 2: Effects From Livestock Grazing

Suitable Rangeland Acres – Suitable rangeland acres are 14-15 percent lower under Alternatives 3, 4, 6, and 7 than the current forest plan, represented by Alternative 1B (Table SW-97). Alternatives 2 and 5 are the same as 1B, or 57 percent total acres for all subbasins. Individually, Goose Creek (47 to 67 percent) and Upper Snake-Rock (38 to 76 percent) subbasins would have a moderate to high amount of suitable rangeland acres, depending on the alternative, while Raft River would have 38 percent of the subbasin in suitable acres across all alternatives, and therefore a lower amount of potential impacts from grazing activities.

Table SW-97. Percent of Suitable Rangeland within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Goose Creek	67%	67%	47%	47%	67%	47%	47%
Upper Snake-Rock	76%	76%	44%	44%	76%	38%	44%
Raft River	38%	38%	38%	38%	38%	38%	38%
All Subbasins	**57%**	**57%**	**43%**	**43%**	**57%**	**42%**	**43%**

Less Restrictive vs. More Restrictive Grazing Management – Overall, grazing management strategies would change only slightly from the current forest plans under most alternatives, from 100 percent to 90-97 percent less restrictive strategies (Table SW-98). Only Alternative 4 would have a slightly lower percentage (46) of more restrictive grazing strategy, and this would only occur in the Raft River and Goose Creek subbasins.

Table SW-98. Percent of Less and More Restrictive Grazing strategies within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	L	M	L	M	L	M	L	M	L	M	L	M	L	M
Goose Creek	100	0	94	6	93	7	40	60	100	0	93	7	88	12
Upper Snake-Rock	100	0	100	0	100	0	92	8	100	0	100	0	100	0
Raft River	100	0	100	0	100	0	49	51	100	0	96	4	78	22
All Subbasins	**100**	**0**	**97**	**3**	**98**	**2**	**54**	**46**	**100**	**0**	**97**	**3**	**90**	**10**

L = Less restrictive grazing strategies; M = More restrictive grazing strategies

Issue 4, Indicator 3: Effects From Wildfire Vs. Treatments to Reduce Wildfire Hazard

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Depressed Populations **–** Only Raft River of the three subbasins where native Yellowstone cutthroat trout occur has subwatersheds at high risk from uncharacteristic wildfires. In this subbasin there are seven subwatersheds with depressed populations at high risk (Table SW-99). All alternatives, with the exception of Alternative 6, have the potential to aggressively treat all subwatersheds where depressed Yellowstone cutthroat populations occur within the Ecogroup area. Alternatives 6 potentially could treat 29 percent of the depressed Yellowstone cutthroat populations within the Ecogroup area.

Table SW-99. Percent of Depressed Yellowstone Cutthroat Subwatersheds Where Risks From Uncharacteristic Wildfires Could Be Reduced within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Raft River	100%	100%	100%	100%	100%	29%	100%

Table SW-100. Percent of Depressed Yellowstone Cutthroat Subwatersheds Where Risks From Uncharacteristic Wildfires Would Remain High within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Raft River	0%	0%	0%	0%	0%	71%	0%

Risks from uncharacteristic wildfires to depressed Yellowstone cutthroat populations would remain high for whose alternatives that treat the least amount of acres and have fewer management tools available to reduce wildfires. If wildfires occurred in high risk from uncharacteristic wildfire subwatersheds, it is believed that some depressed populations could decline further depending on the severity of each fire. Risk from uncharacteristic wildfires may remain high across 71 percent of the depressed Yellowstone cutthroat populations in the Raft River within the Ecogroup under 6 due to the lack of potential treatments. All other alternatives have the potential to reduce uncharacteristic wildfire risks in remaining subwatersheds that contain depressed Yellowstone cutthroat.

Effects of Wildfire vs. Managing Wildfire Hazard in Subwatersheds with Strong Populations - There are 11 subwatersheds considered as strongholds for native Yellowstone cutthroat in the Ecogroup, all within the Raft River subbasin. One population (West Dry-Eightmile Fisher subwatershed), which is isolated, is at high risk from uncharacteristic wildfires (Raft River subbasin) (Table SW-101). Based on MPC emphasis, most alternatives could promote some type of treatment to reduce uncharacteristic wildfire risks in this one stronghold. Only Alternative 6 would not have the potential for treatments in this stronghold. Because high emphasis treatments occur in one of the last remaining strongholds, management activities may pose a greater risk to Yellowstone cutthroat than if an uncharacteristic wildfire occurred for Alternatives 1B 2, 3, 4, 5, and 7. Yet this population is also isolated, suggesting that a severe, uncharacteristic wildfire has the potential to further impact this stronghold population. Since risks of treating or not treating this subwatershed may exists, a comprehensive assessment at the subwatershed and project scale will be needed to evaluate and mitigate these risks before any projects proceed.

Table SW-101. Percent of Stronghold Yellowstone Cutthroat Subwatersheds Where Risks From Management Treatments For Uncharacteristic Wildfires Would Be Higher within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Raft River	100%	100%	100%	100%	100%	0%	100%

Issue 4, **Indicator 4: High Priority Subwatersheds Receiving Appropriate Restoration and Conservation Emphasis** - All ACS priority subwatersheds identified by WARS would have a high emphasis for aquatic restoration in all the action alternatives. Alternative 1B (as amended by Infish, Pacfish, and the BOs) did not identify priority areas for restoration and would not receive this added emphasis. No alternative has MPCs that emphasize the appropriate restoration in a majority of high priority subwatersheds identified by WARS in the Goose, Raft River or Upper Snake-Rock subbasins. This is because WARs recommends active restoration in many subwatersheds, but the action alternatives assign 4.2, 5.1, and 6.2 MPCs that have a moderate to low priority for active restoration. Alternative 1B assigns 4.2 and 6.2 MPCs that also have a moderate to low priority for active restoration. While, these MPCs do not preclude active restoration, they would not be a high emphasis.

When individual subbasins are considered, only Alternatives 4 and 7 have MPCs (3.2) with a higher aquatic restoration emphasis in 40 to 50 percent of the subwatersheds in the Raft River and Goose Creek subbasins, matching the WARS restoration emphasis. This higher restoration emphasis falls primarily in stronghold subwatersheds, covering only a few depressed subwatersheds in the Raft River subbasin (Table SW-102).

Table SW-102. Percent of High Priority Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Goose Creek	0%	25%	25%	50%	0%	25%	50%
Upper Snake-Rock	0%	0%	0%	0%	0%	0%	0%
Raft River	0%	0%	0%	0%	0%	0%	40%
All Subbasins	**0%**	**4%**	**4%**	**9%**	**0%**	**4%**	**17%**

Some subwatersheds have an ACS priority designation in each subbasin. However, none of the ACS priority areas fall within subwatersheds containing depressed Yellowstone cutthroat populations. Although more restrictive management direction would help reduce effects, aquatic restoration in would not be as aggressively pursued in most subwatersheds where depressed populations occur. Delays in restoration may delay habitat improvements in the short term. These delays could place some depressed or isolated Yellowstone cutthroat populations at greater risk in portions of each subbasin.

Effects of Aquatic Restoration in Subwatersheds with Strong and Depressed Populations - Alternatives 4 and 7 have MPCs that emphasize the appropriate restoration and conservation recommended by the WARS to more subwatersheds containing strong Yellowstone cutthroat populations (Tables SW-103) than other alternatives. These alternatives have the potential to improve habitat and watershed conditions in 18 to 27 percent of the strong populations. In contrast, Alternatives 1B, 2, 3, 5, and 6 have the potential to improve habitat and watershed conditions in only 9 percent or less of the subbasins with stronghold populations.

Although many of the alternatives have MPCs that do not have the same aquatic restoration emphasis as WARS, some areas of each subbasin fall within ACS priority subwatersheds. Of the 11 stronghold subwatersheds, five of these fall within ACS priority subwatersheds. It is anticipated that this ACS designation would place a greater emphasis on aquatic restoration so that current conditions would be either maintained or trend toward recovery. However, not all strongholds fall within ACS priority subwatersheds. These subwatersheds may continue to see localized effects to water quality, channel condition, watershed condition, and flow/hydrology pathways where existing problem sites are not addressed in the short term.

Table SW-103. Percent of Yellowstone Cutthroat Strongholds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Goose Creek	0%	25%	25%	50%	0%	25%	50%
Upper Snake-Rock	0%	0%	0%	0%	0%	0%	0%
Raft River	0%	0%	0%	0%	0%	0%	25%
All Subbasins	**0%**	**9%**	**9%**	**18%**	**0%**	**9%**	**27%**

Table SW-104. Percent of Depressed Yellowstone Cutthroat Subwatersheds Receiving Appropriate Restoration or Conservation Emphasis within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Goose Creek	0%	50%	50%	0%	0%	50%	50%
Upper Snake-Rock	NA	NA	NA	NA	NA	NA	NA
Raft River	0%	0%	0%	0%	0%	0%	75%
All Subbasins	**0%**	**17%**	**17%**	**0%**	**0%**	**17%**	**67%**

Issue 4, Indicator 5: Effects From Motorized Trail Use – Trails currently open to motorized use would have that use prohibited within recommended wildernesses under Alternatives 4 and 6. Under Alternative 4, the Raft River subbasin would see the most restrictions, while no motorized trails would be closed under Alternative 6. All motorized trails would remain open under remaining alternatives. Trail restrictions could result in more concentrated use on remaining motorized trails in or adjacent to these subbasins. Management direction for the action and no action alternatives would help to minimize most of these potential impacts. However, impacts to riparian vegetation and stream banks from authorized and unauthorized ATV use may still occur from increased trail use, especially in adjacent subbasins. Effects to aquatic species and SWRA resources would be similar under Alternatives 1-3, 5, and 7. Trail use would not be concentrated, but localized impacts to riparian vegetation and stream channels near crossings would be anticipated.

Cumulative Effects on Native Yellowstone Cutthroat Trout

Non-federal actions are likely to continue affecting listed species. Effects to Yellowstone cutthroat trout from non-federal lands would be high in all subbasins. As described in the Cumulative Effects Common to all Alternatives section, degradation and loss of habitat from non-federal actions would continue. Degraded baseline conditions also would continue to stress populations in most subbasins.

The level of risk associated with cumulative effects was evaluated for each subbasin where sculpin occur within the Ecogroup. Alternatives 1B, 2, 3, 5, and 7 would have a slightly higher risk of cumulative effects based on greater timber, grazing, etc. management and less aquatic restoration, than the other alternatives (Table SW-105). In particular, the Raft River subbasin could see more cumulative effects due to more grazing with less restrictive management direction, less potential for aquatic restoration, potential mechanical and prescribed fire treatments in a stronghold subwatershed, high amount of non-federal ownership and degraded baselines.

Table SW-105. Relative Risks* from Cumulative Effects within Subbasins that Support Native Yellowstone Cutthroat Trout in the Ecogroup, by Alternative

Subbasins	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Goose Creek	11	11	11	10	11	11	12
Upper Snake-Rock	12	12	12	12	12	12	12
Raft River	15	15	15	14	15	13	15
All Subbasins	**13**	**13**	**13**	**12**	**13**	**12**	**13**

***Relative risk rating based upon a maximum total of 18 possible points. Refer to Methodology section to see how ratings were assigned.

Viability Analysis for Native Yellowstone Cutthroat Trout

Projected trends for native Yellowstone cutthroat trout over the first 15 years show that the number of stronghold and depressed subpopulations would remain unchanged. This is because it will take time for subpopulations to respond to restoration and passive/conservation measures (Table SW-106).

Table SW-106. Number of Stronghold and Depressed Yellowstone Cutthroat Subwatersheds at 15 Years within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Goose Creek	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3
Upper Snake-Rock	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1
Raft River	4	12	4	12	4	12	4	12	4	12	4	12	4	12	4	12
Totals	**11**	**16**	**11**	**16**	**11**	**16**	**11**	**16**	**11**	**16**	**11**	**16**	**11**	**16**	**11**	**16**

S = Stronghold Subpopulations; D = Depressed Subpopulations

Projected trends over the long-term indicate a positive trend from current conditions for stronghold populations under Alternative 4. Alternatives 6 and 7 would remain at 11 stronghold populations, while Alternatives 1B, 2, 3, and 5 would show a decrease in the number of strongholds (Table SW-106). These predictions are based upon populations responding favorably where active and passive restoration measures are emphasized and negatively where restoration may not be emphasized. These predictions do not reflect changes in non-native species, harvest trends, etc. It is assumed that the temporary and short-term effects from Ecogroup activities would not compromise the benefits of restoration and conservation where applied due to new and existing management direction.

While no alternative by itself would ensure recovery due to the multitude of cumulative influences involved, those alternatives that have the potential for a faster rate of aquatic restoration would more quickly reduce effects on spawning and rearing habitat. Aquatic restoration, coupled with other management changes, could make great strides in increasing the overall viability of populations in some areas of each subbasin. However, for the predicted increases to be realized, restoration must be funded and implemented with the appropriate prioritization, and improvement to the downstream survival must also occur.

Some subbasins show decreases in the number of strongholds and increases in the number of depressed population subwatersheds under all alternatives (Table SW-107). These projected changes are due to aquatic restoration not receiving the emphasis from assigned MPCs as recommended by WARS and subwatersheds not being assigned an ACS priority. It is believed in high-risk subwatersheds (low geomorphic and water quality integrity) with a lower aquatic restoration emphasis, that existing threats (e.g. undersized culverts, poorly constructed roads) could become worse, causing impacts downstream. If problem sites were not addressed over time, then impacts associated with these sites may become worse and could cause strong populations to decline.

Most Yellowstone cutthroat trout populations are already imperiled because they are isolated from each other due to downstream impacts, most populations are small putting them at greater risk from deterministic density effects, many populations are hybridized with rainbow trout, and habitat conditions are “not functioning appropriately or are functioning at risk” across much of the subbasin. If modeled predictions came true, the loss of any stronghold populations, have implications to the overall metapopulation in each subbasin. This is because there are so few strongholds, any loss could preclude future recovery options.

Table SW-107. Number of Stronghold and Depressed Yellowstone Cutthroat Subwatersheds at 50 Years within Subbasins that Support Native Yellowstone Cutthroat Trout, by Alternative

Subbasin	Current		Alt. 1B		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Goose Creek	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3
Upper Snake-Rock	3	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Raft River	4	12	4	12	4	12	4	12	6	10	4	12	5	11	5	11
Totals	**11**	**16**	**10**	**17**	**10**	**17**	**10**	**17**	**12**	**15**	**10**	**17**	**11**	**16**	**11**	**16**

S = Stronghold Subpopulations; D = Depressed Subpopulations

Cumulative Effects

Cumulative Effects Common To All Alternatives, Issues, and SWRA Resources

Non-federal actions are likely to continue affecting SWRA resources. The cumulative effects in the affected areas are difficult to analyze, considering the broad geographic landscape covered by the areas, the uncertainties associated with government and private actions, and ongoing changes to the region’s economy. Whether those effects will increase or decrease in the future is a matter of speculation; however, based on the growth trends and current uses identified in this section, cumulative effects are likely to increase.

For the most part, the stream systems of the Ecogroup area originate on-Forest and eventually flow downstream onto lands owned or administered by entities other than the Forest Service. Several TMDLs and 303(d) water quality limited water bodies occur within the Ecogroup area. Many more impaired streams are located downstream from the Ecogroup. Therefore, Forest Service actions can affect to impaired streams, positively or negatively, both on and off National Forest System lands. Many fish populations, whether they move off-Forest as part of their life cycle or remain entirely within a localized area, require interconnectivity of these streams to survive as a population. For most all species, genetic interchange between subpopulations is necessary to maintain healthy fish stocks. The more wide-ranging a species or population is, the more critical interconnectivity may be in order to access important habitat components. Thus, activities off-Forest that disrupt fish migration corridors can have significant impacts to fish populations upstream.

The most complex cumulative effects relate to the restoration of anadromous fish stocks and wide-ranging resident species within the project area. The complexity of these life histories exposes them to many factors affecting their abundance and viability. Cumulative effects to anadromous and wide-ranging resident fish species include: (1) reduced streamflows from water diversions for urban, agricultural and other purposes; (2) destruction or degradation of spawning and rearing habitat from logging, grazing, mining, farming and urban development on private and other non-federal lands; (3) degraded water quality as a result of polluted runoff from urban and rural areas; (4) migration barriers that result from dams on private or other non-federal lands (not regulated by the federal government); (5) introduced diseases, resource competition and gene pool dilution as a result private-, tribal- or state-operated hatcheries; (6) commercial and tribal fisheries on chinook salmon; (7) mortality as a result of illegal harvest through incidental catch; (8) habitat degradation associated with non-federal road building and maintenance; and (9) competition, predation and hybridization problems associated with introduction of non-native fish.

The affected area for cumulative effects to Issues 1, 2, and 3 includes the land administered by the three National Forests in the Ecogroup and lands of other ownerships within the National Forest boundaries. An estimated 23 percent of subbasins where the Ecogroup manages lands are in private ownership (Table SW-108). For the affected areas under Issue 4, an estimated 41 percent of the subbasins that support Yellowstone cutthroat, 36 percent of the subbasins that support Wood River sculpin, 20 percent of the subbasins that support bull trout, and 9 percent of subbasins that support westslope cutthroat and anadromous fish occur on private lands (Table SW-108). Subbasins that have the greatest potential for effects from private land activities include the Lower Boise, Lake Walcott, Payette, N. F. Payette, Weiser, Brownlee Reservoir, Lemhi, Lower Salmon, Raft River, Goose Creek, Salmon Falls and Camas Creek. Effects in these subbasins would be greatest along river valleys and the lower portions of major tributaries.

Table SW-108. Percent Landownership in Affected Area for SWRA Resources

Resource - Issue	SW Idaho Forests	Other Federal*	Private	BLM	State	Unknown
Soil, Water, and Riparian (Issues 1 to 3)						
All Subbasins within Ecogroup	24%	11%	23%	20%	2%	20%
Aquatic Fish Species (Issue 4)						
Steelhead, Chinook, Sockeye	30%	47%	9%	13%	1%	<1%
Bull Trout	34%	28%	20%	11%	3%	4%
Westslope Cutthroat	30%	47%	9%	13%	1%	<1%
Yellowstone Cutthroat	14%	<1%	41%	30%	2%	13%
Wood River Sculpin	21%	<1%	36%	39%	4%	<1%

*Other Federal includes lands administered by the Department of Defense, Energy, and Interior, excluding BLM.

Corporate Timberlands - Private land timber harvest and related road construction activities within Idaho are regulated by the Idaho Forest Practices Act (IFPA) under the Idaho Department of Lands IDL and the Oregon Forest Practices Act (OFPA) under the Oregon Department of Forestry (ODF). Neither the IFPA nor the OFPA provide the level of protection and conservation for SWRA resources as the Forest Service and BLM provide on federally administered lands.

State Administered Lands - Lands administered by the State of Idaho comprise 2 percent of the affected areas under Issues 1, 2, and 3, and between 1 and 4 percent of the subbasins that support aquatic fish species within the affected areas under Issue 4. Subbasins that have the greatest potential for SWRA resources effects from state lands include the Boise-Mores, South Fork Boise, Payette, North Fork Payette, Weiser River, Camas Creek, and Little Wood River. State-administered logging and grazing is expected to contribute short-term negative effects to spawning, rearing, and migration habitats for aquatic species and SWRA resources. The States of Idaho and Oregon have or are in the process of developing conservation plans and revising land use regulations to address listed aquatic species. Because of these efforts, it is assumed that negative effects would diminish and aquatic habitat on state lands would remain stable or slowly improve over the long term. However, the rate and extent of improvement are expected to be much lower than that projected for federal lands.

Local Actions - Local governments will be faced with direct pressures from population growth and movement. There will be demands for intensified development in rural areas, as well as increased demands for water, municipal infrastructure, and other resources. In the past, local governments in the two states generally accommodated growth in ways that negatively affected SWRA resources. Because there is little consistency among local governments regarding the way they address land use and environmental issues, both positive and negative effects on aquatic species and SWRA resources can be expected throughout the affected area.

Other Federal Actions - There has been, and continues to be, strong direction from federal authorities to restore and maintain healthy watersheds and associated aquatic ecosystems. Many recent planning efforts have identified the need to prioritize and restore degraded watersheds and improve SWRA and related resources, including: the National Fire Plan, Healthy Forest Initiative, Final Basinwide Salmon Recovery, Draft Bull Trout Recovery Plans, State DEQ water body assessments, Clean Water Action Plan (CWAP), the Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters, recent listings of salmon, steelhead, and bull trout and their associated Biological Opinions. These plans and policies will have a cumulative influence on the management of federal and other landownerships within and adjacent to the Ecogroup area.

Actions on adjacent National Forests (Nez Perce, Salmon Challis, etc.) and Bureau of Land Management lands are expected to continue to implement Infish and Pacfish management direction until their land management plans are revised. Standards and guidelines should provide a high level of protection to aquatic resources and minimize most effects. This is because any action that "degrades" habitat conditions would be considered inconsistent with the concept of obtaining RMOs. Actions and facilities should also not measurably slow the rate of recovery or cause permanent or long-term modifications of the physical and biological processes or conditions that determine the RMO features. If uses or facilities caused large enough effects to any physical or biological processes that influenced maintaining or obtaining RMOs, then it would be deemed inconsistent and would need to be modified. Some short-term, localized effects would still be anticipated.

Dams maintained and operated by the Bureau of Reclamation and Army Corps of Engineers, on the Snake and Columbia Rivers, continue to reduce anadromous fish numbers. Dams and associated reservoirs have reduced migration success for both downstream migrating smolt and returning adults. These dams have increased mortality to these fish through predation, disease, and mechanical injury. Dams, water diversions, channel dewatering, and stream modifications have also disrupted migration and connectivity for many resident fish species, especially fluvial and adfluvial bull trout.

Federally operated fish hatcheries have contributed to developing weaker fish populations by diluting natural genetics and encouraging competition between hatchery fish and wild fish stocks. However, some negative effects from these hatcheries are expected to decline as management practices are changed to respond to impacts on listed salmonids.

Cumulative Effects for Issue 1

Increased uncharacteristic wildfire hazard increases the risk from fires that move from other ownerships to National Forest System lands. Some vegetative conditions on adjacent ownerships, particularly private lands, are relatively hazardous. Therefore, while the hazard on other ownerships may be high, the effects of fires moving onto National Forest System lands from other ownerships can change with changes in hazard. Lower hazard allows opportunities to suppress oncoming fires and keep them small, or to reduce the effects of these fires. Conversely, higher hazard on National Forest System lands increases the risk of large, difficult to suppress wildfires that can cross over onto other ownerships. Reducing the uncharacteristic wildfire hazard on other ownerships will reduce the risk of loss of soil-hydrologic function and soil productivity to National Forest System lands.

Cumulative Effects for Issue 2

The subwatersheds considered at risk to post-wildfire floods and debris flows include subwatersheds in which other landownerships are within or downstream of lands administered by the Ecogroup Forests. In these cases, vegetative conditions and treatments to reduce hazard may be more strategically placed at a landscape scale. However, the risk to human life, property, and/or municipal watersheds located downstream also depends on the watershed conditions found upstream of those lands, including vulnerability, soil-hydrologic condition, fuel conditions, and climatic patterns. The intent of the National Fire Plan is to develop strategies and treatments that are coordinated between various landowners, including federal agencies, to address the variety of hazards and risks that occur to reduce undesirable wildfire effects on all lands. This coordination would extend the effects of treatments beyond lands administered by the Forest Service. These effects may change the post-wildfire risks to human life, property, and municipal supply watersheds on both the on-Forest and off-Forest portions of these subwatersheds. Ultimately however, protection of life, property, and/or municipal supply watersheds on other ownerships is the responsibility of those owners.

Cumulative Effects for Issue 3

Cumulative Effects on 303(d) Water Quality Limited Water Bodies - Non-federal actions are likely to continue affecting water quality within subwatersheds containing the 303(d) water quality limited water bodies. Due to a small percentage of non-federal ownership, effects to water quality from non-federal lands would be relatively low in the following subbasins: South Fork Salmon, Upper Middle Fork Salmon, South Fork Payette, Middle Fork Payette, North and Middle Fork Boise, Middle Salmon-Chamberlain, and Lower Middle Fork Salmon subbasins. All other subbasins may have relatively high cumulative effects from non-federal lands. The effects associated with the Forest management activities may assist in improving water quality and beneficial use status related to 303(d) water quality limited water bodies on both the on-Forest and off-Forest portions of these subwatersheds and subbasins.

Cumulative Effects on TMDLs - Non-federal actions are likely to continue affecting water quality within the TMDL watersheds. Effects to water quality from non-federal lands would be low overall in the South Fork Salmon and Middle Fork Payette subbasins as non-federal lands comprise only a small portion of these TMDL watersheds. However, cumulative effects from non-federal lands would be high in the TMDLs for the Lower Boise, Lake Walcott, and Upper Snake-Rock. As described in the Cumulative Effects Common to all Alternatives, implementation of the existing TMDL watershed restoration plans should greatly improve the water quality within these TMDLs. The effects associated with the Forest management activities may assist in improving water quality and beneficial use status related to TMDLs on both the on-Forest and off-Forest portions of these subwatersheds and subbasins.

Cumulative Effects for Issue 4

See the species-specific discussions for Issue 4 in the Direct and Indirect Effects section, above.

Vegetation Diversity

INTRODUCTION

Biodiversity has been defined as the variety of living organisms; the genetic differences among them; and the communities, ecosystems and landscapes in which they occur (Noss 1990, West 1995). Biodiversity has leapt to the forefront of issues due to a variety of reasons; changing societal values, accelerated species extinctions, global environmental change, aesthetic values, and the value of goods and services supplied (West 1995). Maintenance of ecological functions, processes, and disturbance regimes is as important as preserving species, their populations, genetic structure, biotic communities, and landscapes. Hence ecosystem-level processes, services, and disturbances must be considered within the arena of biodiversity concerns (West and Whitford 1995). The biological diversity that is supported by a particular area is generally a positive function of the degree of environmental heterogeneity occurring over space and time within that area (Longland and Young 1995).

Vegetation is a cornerstone of biological diversity. Vegetation exerts its influence into almost every facet of the biophysical world. Many biophysical processes and functions depend on or are connected to vegetative conditions. Vegetation is an integral part of ecosystem composition, function, and structure. Vegetation shapes and in turn, is shaped by the ecosystems in which it occurs. It provides plant and animal habitat, and determines wildfire and insect hazards. Leaves, branches, and roots contribute to soil productivity and stability. Large wood in streams increases physical complexity, providing more habitat diversity. Vegetation shades streams, helping to maintain desirable water temperature, and also acts as a physical and biological barrier or filter for sediment and debris flowing from adjacent hillsides toward streams. Indeed, vegetation provides so many different aspects of ecosystems that it is impossible to list them all.

For many resources, vegetation condition is the single most important component that determines effects. Vegetation is important to humans not only because of our use of products such as timber and forage, but also through other experiences such as camping, hiking, or viewing scenery. Vegetation plays a major role in ecosystem process and function; hence it plays a major role in the diversity of living organisms. Conservation of biodiversity is important at the genetic, species, and ecosystem levels of organization, and vegetation unites many of these components and processes.

Systems thinking involves studying ecological and human processes holistically. It builds on detailed knowledge about composition, structure, and function. A holistic analysis often draws conclusions different from a summing of the parts (Purvis 1996). Landscape mosaics are mixtures of natural and human-managed patches that vary in size, shape, and arrangement (Forman and Godron 1986). Ecogroup vegetation management strategies are aimed at providing ecological components, patterns, and processes operating at several scales in landscapes; this is the coarse filter approach, which seeks to provide for the full range of biological organisms in each ecosystem. Implementation of the coarse filter approach presents some risk because it requires that managers understand the consequences of their actions. Several studies have suggested that the landscape has critical thresholds at which ecological processes will change qualitatively (Turner 1989). The more we learn about ecosystems, the greater the likelihood that our assumptions about ecosystem response will improve and we will achieve the conditions we desire. A coarse filter management strategy would not be complete without its complement, the fine filter approach, which provides a necessary species-specific management strategy. This fine filter approach is discussed throughout other sections in this chapter, most notably *Botanical Resources, Soil, Water, Riparian, and Aquatic Resources*, and *Terrestrial Species and Habitat*.

Coarse filter units are described here with classification systems that consider groups or communities of vegetation, appropriate for mid-scale planning. The Forests have traditionally used cover type, strata, habitat type, and community types to classify these vegetative variations on the landscape. Over the past several years, large-scale disturbances such as wildfires and insect epidemics have prompted land managers to evaluate whether the current vegetative conditions are sustainable. Additional issues have centered on how vegetative conditions affect biodiversity, plant, animal, and fish viability, and ecosystem processes and functions.

Historical range of variability (HRV) concepts were developed in part to better understand how disturbances, vegetation, and other ecosystem components interact, and in turn how interaction affects biophysical characteristics, such as plants, animals, fish, soil and water resources, and numerous other resources. Historical perspectives increase our understanding of the dynamic nature of landscapes and provide a frame of reference for assessing modern patterns and processes (Swetnam et al. 1999). Underlying this concept is the assumption that ecosystems operating within their historical range have evolved within the influence of disturbances, such as insects, disease, and fire. Insects, disease, and other disturbance agents generally operated at endemic or characteristic levels within historical landscapes (Harvey 1994). Over the last century, shifts in species composition and density have created vegetative conditions where insects, disease, and wildfire may operate at epidemic or uncharacteristic levels. Disturbances operate in a heterogeneous manner in the landscape; gradients of frequency, severity, and type are often controlled by physical and vegetative features. The differential exposure to disturbance, in concert with previous history and edaphic conditions, leads to the vegetation mosaic observed on the landscape (Turner 1989).

Historically, fire regime was the principal factor determining the mosaic of different stand ages across the landscape (Lesica 1996). The concept of ecosystem ranges of variability (Morgan et al. 1994) has been suggested as a framework for coarse filter conservation strategies (Hunter 1990). Natural variability is defined as the ecological conditions, and the spatial and temporal variation in these conditions, that are relatively undisturbed by humans, within a period of time and geographical area appropriate to an expressed goal (Landres et al. 1999). A coarse filter conservation strategy seeks to preserve biological diversity by maintaining a variety of naturally functioning ecosystems across the landscape. If it is possible to produce or mimic the historic ranges in stand size, composition, and connectivity by forest type on current and future landscapes, then much of the habitat for native flora and fauna should be present. Mimicking the historic ranges of snags and coarse woody debris should also help these conservation strategies. Although coarse woody debris is an important structural component of forest ecosystems, managing for maximization of coarse woody debris, or having uniform standards across historically variable landscapes, is a fine-filter strategy that can literally backfire. The use of coarse woody debris levels characteristic of historical disturbance regimes is recommended as an alternate system more likely to be sustainable (Edmonds and Marra 1999). Fine-filter strategies, such as individual species plans or snag retention, might still be needed, but most species and ecosystem elements should be present if natural ranges in habitat are provided (Haufler et al. 1996).

The current Forest Plan revision effort uses a combination of these approaches to describe past, present, and future vegetative conditions. For the purposes of organization and clarity, vegetation diversity has been divided into three subsections: (1) forested vegetation, including forestlands, snags, and coarse woody debris, (2) non-forested vegetation, including woodlands, shrublands, and grasslands, and (3) riparian vegetation, including riverine (forested) riparian areas and deciduous riparian areas.

Forested Vegetation

The key to a healthy ecosystem is structural and functional diversity across forested landscapes (Franklin and Forman 1987). The achievement of multiple-use objectives dictates that Forest managers maintain biological diversity. A diversified forest provides a greater array of products, biological organisms, and greater inputs to soil organic matter and nutrients. The increased genetic diversity contributes to sustained productivity because the loss of trees to pathogens, climatic change, or pollutants is less (Franklin and Maser 1988).

The variety of vegetative species that occur within ecosystems contributes to processes and functions in different ways. Some species, such as ponderosa pine or western larch, are long-lived and can persist on the landscape. Others, such as aspen, are shorter-lived and, in the absence of disturbance, are sometimes quickly replaced by more shade-tolerant conifers. Different species host different insect and disease agents, which in turn influence wildlife uses. The decaying fungi introduced by bark beetles facilitate excavation by primary cavity nesters (Bull et al. 1997). Other species like grand fir, which is often infected with heart rotting fungi, provide large, live hollow spaces for wildlife. In addition, various tree species respond differently to disturbance. Some are more fire or drought tolerant or have developed adaptations to persist in the presence of these disturbances. Seral species, particularly when maintained within desired densities, are generally more tolerant of disturbances such as fire, and have fewer insect and disease problems (Covington et al. 1994). Others tolerate shade better. Some are more susceptible to frost damage, and others have adapted to fluctuating water tables.

Forested habitat types, which use potential climax vegetation as an indicator of environment, define similar land units. Each habitat type represents a relatively narrow range of environmental conditions. Individual habitat types are named according to the dominant climax overstory species in conjunction with the dominant understory species (grass, forb, or shrub). Individual habitat types are described in terms of their capability of producing climax plant communities in the absence of disturbance. In plan revision, forested habitat types have been further grouped into potential vegetation groups (PVGs) that share similar environmental characteristics, site productivity, and disturbance regimes. The purpose of these groupings is to simplify the description of vegetative conditions for use at the broad scale. Often, the existing vegetation (cover type) is a seral stage to a climax plant community, and generally results from some form of disturbance. The dominant forest overstory can vary with this successional change. Cover type classifications typically describe the current dominant vegetative cover or species occupying a site. Cover types can be used to describe seral stage species composition in relation to forested climax species composition or historical conditions. As noted above, this analysis uses a combination of these approaches to describe vegetative conditions.

Distribution of tree size classes also contributes to biodiversity on the landscape. As forest vegetation develops following disturbance, it moves through these size classes as part of successional development. Some species (ponderosa pine, Douglas-fir, and grand fir) grow to very large sizes, while others rarely grow into the large tree size (lodgepole pine, aspen). In some cases there are distinct plants, animals, and processes tied to these stages. Some vegetative species reproduce best in the conditions provided by openings. Many early seral plants, which are often shade-intolerant, depend on these openings in order to maintain themselves over time in certain ecosystems. Some animal species also depend on these openings for foraging. However, these same animals often require the conditions provided by other size classes for activities like nesting or denning. Therefore, the distribution of size classes can directly affect distribution of plants and animals.

In addition to species composition and size class, density, described using canopy closure, is also an important feature of vegetation. Many shrubs and forbs persist longer under open conditions than where little sunlight reaches the ground. However, some shade-tolerant species depend on this dense shade to complete their life cycles. Some animal species are more common in denser conditions, while others prefer more open conditions. Canopy closure (or density) plays a major role in how disturbances such as insects, disease, and fire operate. In general, individual plants become stressed under denser conditions due to increased competition for light, water, and nutrients. Stressed vegetation is often more susceptible to insects and disease, and outbreaks often start in these areas. Dense vegetative conditions also contribute to development of uncharacteristic lethal fires.

Snags are standing dead trees. Coarse woody debris is defined as woody material greater than 3 inches in diameter (Graham et al. 1991). Snags, live trees with decay, hollow trees, logs, and other woody debris provide an important ecological component in forest ecosystems. They are used by wildlife for foraging, nesting, denning, roosting, and resting (Bull et al. 1997). Countless invertebrate, microbial, and fungal species utilize them for habitat. Snags also have effects on fire behavior (Agee 1993) and fish habitat (Platts 1983). Eventually, snags may become down logs or coarse woody debris, contributing to soil and site productivity after the material falls to the ground. Woody debris, both coarse and fine, contributes to nutrient cycling and reserves, water storage (Maser et al. 1979), and physical and chemical soil characteristics (Bull et al. 1997).

Non-forested Vegetation

At the landscape level, non-forest ecosystems are a mosaic of patches. Each patch in the mosaic has attributes peculiar to that patch. The output resulting from any ecological process for an entire landscape is not just the sum of the outputs for each patch, but the sum of interactions between patches as well (Brown and Howard 1996). Under pristine conditions in non-forest landscapes, small-scale and infrequent herbivory may have been the predominant mechanism of stand renewal; but this process has been overshadowed during this century by large-scale, catastrophic fires (Longland and Young 1995). A promiscuous burning period in which fires were intentionally set characterized stand renewal shortly after European settlement of the West. For the past several decades, however, this has been replaced by frequent unintentional fires carried by fine fuels provided by introduced annual weeds. These changes in the spatial and temporal patterns of stand renewal reduce environmental patchiness and its associated biodiversity in these non-forest landscapes (Longland and Young 1995). Over time, many areas of sagebrush have become denser as livestock eliminated understory grasses and fires were suppressed, tipping the competitive advantage toward shrubs (Tisdale and Hironaka 1981). However, patchiness at small scales is essential to maintaining biodiversity at larger landscape scales (Longland and Young 1995). Native perennial grasses lack the competitive advantages of shrubs and introduced annuals in these systems (West 1988, Laycock 1987). Often, neither complete protection nor conservative management can restore a desirable vegetative cover within a reasonable period because a seed source of desirable species is lacking and competition from the undesirable plants is severe (Blaisdell et al. 1982). Management responses on non-forest landscapes are difficult to measure, due to the extreme spatial and temporal variation of the vegetation (Wight 1987).

Non-forest stands may vary from expanses of single species to multi-species mosaics where sagebrush is intermixed with other shrubs. Other shrub communities often occur adjacent to sagebrush shrublands. Grassy openings, springs, seeps, moist meadows, riparian streamsides, pinyon-juniper woodlands, aspen stands, and rock outcrops all add to the sagebrush mosaic (Paige and Ritter 1999). The distribution of various species of sagebrush is strongly correlated with factors such as climate and soils (Shumar 1984, Blaisdell et al. 1982). The sagebrush region of southern Idaho extends from elevations of approximately 2000 feet to about 9500 feet, and the area receives from 7 to 20 inches of rainfall annually (Kaltenecker and Wiklow-Howard 1994). Hironaka et al. (1983) describe the sagebrush habitat types for southern Idaho. Usually a single species of sagebrush is dominant in a community, but communities differ widely in understory plants (Paige and Ritter 1999).

Most of the early efforts in revegetation of sagebrush-grasslands were oriented toward increasing quantity and quality of livestock forage and providing better watershed protection (Blaisdell et al. 1982). This strategy often resulted in stands of crested or other exotic wheatgrasses. With the recognition of the limited value of single species and the risks involved from factors such as insects, disease, and drought, increasing attention was given to mixtures that would provide better wildlife habitat, improve aesthetics, include legumes for nitrogen fixation, and provide better nutritional balance for both livestock and wildlife. Later, increasing emphasis has been placed on the use of shrubs in mixtures for range revegetation (Blaisdell et al. 1982). One key to improving sagebrush ecosystem vigor and productivity is to maintain or increase the diversity of its components. Diversity in this sense means variety and mixture of plant and animal species, vegetative age classes, differing height structure, and horizontal patchiness within relatively small units of the landscape (McEwen and DeWeese 1987).

Pinyon-junipers woodlands are one of the most static of all western ecosystems; change is not evident without a lengthy horizon (Dobrowolski 1995). Drought, competition, and fire played a complimentary role in limiting the distribution of pinyon and juniper before grazing by domestic livestock became an influence (Tisdale and Hironaka 1981, Wright et al. 1979). During the last 130 years, grazing has removed fuel for ground fires. This influence, together with fire suppression management strategies, may have encouraged the spread of pinyon-juniper communities. As sagebrush communities are converted to pinyon-juniper woodlands, community structure, composition, function, processes, and wildlife habitat are altered. During this conversion, a threshold is crossed, and communities move to new steady states with different ecological processes (Tausch 1999, Miller et al. 1999). Once a threshold has been crossed, it becomes significantly more difficult to return communities to previous states; therefore, the identification of spatial and temporal heterogeneity in pinyon-juniper woodlands is extremely important when evaluating potential resource problems and setting realistic goals and timeframes for effective management (Miller et al. 1999).

Aspen frequently occurs at its lowest elevations as stringers or small islands on the fringe of the semiarid sagebrush-grass steppes. At intermediate elevations it is usually found as pure or mixed stands, interspersed among a variety of coniferous forest types, or as groves among forest-herbland ecotones. At the higher elevations, it functions primarily as a seral dominant tree. The environmental conditions determining aspen's role as a seral or as a climax tree species remain ill-defined (Mueggler 1988). We analyze climax aspen as part of the non-forest vegetation types analysis, as opposed to seral aspen, which is covered as a species component in the forested PVGs.

Existing vegetation or cover type is a seral stage to a climax plant community, and generally results from some form of disturbance. The dominant overstory can vary with this successional change. Cover type classifications typically describe the current dominant vegetative cover or species occupying a site. Cover types can be used to describe seral stage species composition in relation to climax species composition or historical conditions. Existing non-forested vegetation groups or cover types may approximate the dominant climax vegetation, or in other situations, display variations from past use, management, and/or disturbance. Unlike forested vegetation, shrubland and woodland successional change is not likely to be fully detected at the broad scale using only cover types. This is because the same overstory species may occur as part of several successional stages for the vegetative community. However, a cover type's density or canopy cover can be used as a complimentary indicator to define in part, successional change, ecological condition, and disturbance regime influence.

Similar to forest canopies, shrub or woodland overstories exert a competitive influence on herbaceous understory composition and productivity. Both herbaceous species and shrub diversity decrease as succession proceeds to later seral conditions (Longland and Young 1995). For these reasons, we used cover types of non-forest vegetation as a proxy for potential vegetation and conducted mapping utilizing a remote sensing classification with LANDSAT of both cover types and canopy covers for several non-forest vegetation types (McClure et al., in press). Woodland cover types were determined as part of the forested vegetation PVG mapping process. Additional cover types not represented by these methods, or in areas of the Ecogroup not covered by the more refined PVG and cover type mapping—such as grasslands, montane shrub, meadows, etc.,—were mapped as existing vegetation cover types using a remote sensing classification of LANDSAT developed at the University of Montana (Redmond et al. 1998), or in areas not covered by this project, with the Idaho/Western Wyoming Land Cover Classification developed by Utah State University (Edwards and Homer 1996).

Similar to forested vegetation, historical ranges of variability are used as a reference point for understanding how disturbances, vegetation and other ecosystem components interact.

Riparian Vegetation

Riparian areas are water-dependent systems that consist of lands adjacent to streams, rivers, and wetland systems. They are the ecological links between uplands and streams, and between terrestrial and aquatic components of the landscape. Important physical processes in riparian areas primarily relate to the interactions among stream channels, adjacent valley bottoms, and riparian vegetation, which depend on the frequency of floodplain inundations. Riparian vegetation plays a role in many physical processes within riparian areas. Vegetation shades streams and moderates water temperatures by helping to keep waters cool in the summer and providing an insulating effect in the winter. The vegetation also acts as a filter for materials generated in the uplands. Riparian vegetation promotes bank stability and contributes organic matter and large woody debris to some stream systems, which is an important component of instream habitat (Sedell et al. 1990, Hicks et al. 1991, Gregory et al. 1991, Kovalchik and Elmore 1992, Henjum et al. 1994).

The quantity and composition of riparian plants influence both the terrestrial and aquatic functioning of riparian areas (Meehan et al. 1977, Gregory et al. 1991). Riparian vegetation, along with channel and floodplain geomorphology, helps to shape the structure of aquatic habitats. Submerged roots, branches, and large woody debris usually enhance productivity of a stream or river reach by adding habitat complexity and providing cover, particularly for fish. Vegetation in riparian areas also stabilizes stream banks (Sedell and Beschta 1991); decreases erosion by reducing surface disturbance; prevents down-cutting that can lead to lower water tables; and traps and transforms nutrients, chemicals and sediment by maintaining surface and subsurface hydrologic processes. Riparian habitats consistently support greater diversity and abundance of wildlife than most other cover types (Brinson et al. 1981). Riparian areas function as habitat for vertebrate wildlife and provide corridors for wildlife movement and migration. They also act as wildlife refuges during wildfires, and streamsides are often the first areas reoccupied by wildlife after stand-replacing fires.

Riparian vegetation cannot be mapped accurately with the use of broad-scale mapping techniques (ICBEMP 1997c, Wisdom et al. 2000). Consequently, management considerations for riparian and wetland species much be evaluated at finer scales. Riparian life forms were determined from the Idaho/Western Wyoming Land Cover Classification developed by Utah State University (Edwards and Homer 1996). A more detailed classification of riparian types is not available at the broad scale.

Issue and Indicators

Issue Statement - Forest Plan management strategies may affect vegetative biodiversity by changing size class, density, species composition, structure, snags, and coarse woody debris.

Background to Issue - Public comments expressed a wide range of concerns about the way vegetation across the Ecogroup should look and function, including completely opposite points of view. Opinion also varied regarding what tools should be used to alter or maintain vegetative conditions. This issue focuses on changes in vegetative biodiversity related to composition, structure, and function that may occur under the management alternatives. As such, it forms the foundation for how changes in vegetation may affect other resources, such as timber, range, wildlife and fish habitat, fire, soil-hydrologic function, riparian areas, and scenic environment. The indicators will measure changes in vegetative conditions and compare them to reference conditions and desired conditions for each vegetation group.

Indicators - The indicators for this issue are designed to display potential changes by alternative to vegetation conditions for specific components in specific vegetation groups. These vegetation components reflect the stand or community history, and current ecological processes and functions. Table V-1, below, shows the components or measures that are incorporated within the alternative comparison indicators. These vegetative conditions or components will change based on the inherent growth rates of vegetation and disturbance processes, as influenced by the type and amount of management treatments applied in each alternative.

Table V-1. Indicator Components for Vegetation Diversity Issue

Vegetation Group	Indicator			
	Species Composition	Size Class	Canopy Closure	Snags and Coarse Woody Debris
Forested Potential Vegetation Groups	X	X	X	X
Grassland Cover Types	X		X	
Shrubland Cover Types	X		X	
Woodland Cover Types	X		X	
Riparian Communities	X	X		X

For the purposes of Forest Plan revision, the three Forests have been broken down into forestland, woodland, shrubland, grassland, and riparian vegetation groups. Forestland vegetation refers to land that contains at least 10 percent crown cover by forest trees of any size or type, or land that formerly had tree cover and is presently at an earlier seral stage. Forestland vegetation is comprised of conifer trees, and associated broadleaf trees and understory vegetation such as shrubs, forbs, and grasses. Woodlands refer to the climax aspen and pinyon pine-juniper communities found in the southern portion of the Ecogroup. Shrubland occurs when there is less than 10 percent tree crown cover of an area. Grassland occurs when there is less than 10 percent tree crown cover of an area and greater than 15 percent grass or herbaceous cover. Riparian communities are generally defined as those regions connected with or immediately adjacent to banks of streams, rivers, or other bodies of water, or having a moisture regime that promotes the establishment of species adapted to such environmental conditions. This analysis looks at both coniferous or riverine (forested) and deciduous (non-forested) riparian communities.

Not all components in Table V-1 are used for all vegetation groups in this analysis. This is due in part to the fact that not all components occur in all groups, and in part to limitations of existing technology in classifying certain types of vegetation at the broad scale. Because of component differences and the variations in forested and non-forested indicators, the different vegetation groups are discussed and analyzed in separate subsections. The forested vegetation subsection covers forestland, snags, and coarse woody debris. The non-forested vegetation subsection covers the woodland, shrubland, and grassland. The riparian subsection covers the forested (riverine) and the non-forest riparian types.

The following indicators are used to measure the effects on forested vegetation for the three Forests by alternative:

- *Size class changes toward desired and historical size classes by Forest and PVG* - The large tree size class was historically the most common in a number of PVGs. In others, a greater diversity of size classes occurred on the landscape. The analysis projects size class changes both toward desired conditions and as compared with PVG historical estimates for the fifth, tenth, and fifteenth decades to indicate long-term forest structural changes by alternative. A decrease in variation generally indicates an alternative would move the size class distribution toward the desired conditions and/or the estimated historical range.

- *Canopy closure changes toward desired and historical canopy closures by Forest and PVG* - Canopy closure historically varied among the PVGs. In some cases, canopy closures were low due to the historical disturbances. Moister sites, which have historically longer disturbance return intervals, maintained more area in moderate and high canopy closure. The analysis projects canopy closure changes both toward the desired conditions and as compared with historical estimates for the fifth, tenth, and fifteenth decades to indicate long-term forest density changes by alternative. A decrease in variation generally indicates that an alternative would move the forested stands toward the desired conditions and/or estimated historical range of canopy closure and density.

- *Species composition changes toward desired condition and historical seral status by Forest and PVG* - Many PVGs were historically dominated or co-dominated by seral species, which were often better adapted to disturbances that frequented the landscape such as fire. The analysis projects species changes outside of PVG desired and historical ranges to indicate long-term forest composition changes by alternative. A decrease in variation generally represents a shift toward desired and/or historical status, or toward earlier seral species.

- *Synthesis of all the components from desired and historic conditions by Forest* – Ranking of alternatives in terms of how the desired and historic conditions in the fifth, tenth, and fifteenth decades provides a relative indication of how each alternative's forest landscape is responding to management. The more PVGs operating within desired conditions overall means that an alternative is meeting the functions for which it was designed. Landscapes operating within or close to historical conditions are expected to be more resistant and resilient to endemic levels of insects, disease, and fire, and they are expected to produce characteristic responses.

- *Percentage of large trees by alternative in the second, fifth and tenth decades* – The extent of forested areas with large trees identifies the potential for recruitment of snags and coarse woody debris. A percentage of these large trees would also provide for vegetation structure and function in forested riparian areas.

The following indicators will be used to measure the effects on non-forested vegetation for the three Forests by alternative:

- *Acres of big sagebrush (three subspecies) and low sagebrush in low, medium, or high canopy cover classes, as compared to the desired conditions for each alternative and historical estimates* **-** The analysis projects change in acreages of canopy cover classes to indicate long-term structural class changes by alternative. Canopy cover often varied across the landscape, providing a range of structural classes and associated functions.

- *Acres of climax aspen in a range of size and canopy cover classes, as compared to the desired conditions for each alternative and historical estimates* **-** The analysis projects change in acreages of size/canopy cover classes to indicate long-term structural class changes by alternative. Size and canopy cover often varied across the landscape, providing a range of structural classes and associated functions.

- *Acres of pinyon-juniper in a range of size and canopy cover classes, as compared to the desired conditions for each alternative and historical estimates* **-** The analysis projects change in acreages of size/canopy cover classes to indicate long-term structural class changes by alternative. Size and canopy cover often varied across the landscape, providing a range of structural classes and associated functions.

- *Acres of grassland cover types that occur within low, medium, or high vegetative maintenance and restoration Management Prescription Categories (MPCs)* **–** The assignment of grassland areas to certain management prescriptions will affect the ability to maintain where necessary, and manage and influence the rate of recovery for obtaining properly functioning condition within grassland community types.

The following indicators will be used to measure the effects on riparian vegetation for the three Forests by alternative:

- *Percentage of large trees by alternative with in the second, fifth and tenth decades for forested (riverine) riparian areas* – The large tree component is necessary for providing vegetation structure and function in forested riparian areas.

- *Overall synthesis of forested PVGs for meeting desired conditions and historical conditions* – Effects on the uplands have direct correlation to conditions in riparian areas. Also, in forested riparian areas, they are part of the same PVGs considered for each Forest.

- *Total acres that occur within low, medium, or high vegetative maintenance and restoration MPCs to assess effects to deciduous riparian cover types* – The relative amounts of MPC groups in the different alternatives will affect the ability to maintain where necessary, and manage and influence the rate of recovery for obtaining properly functioning condition within deciduous riparian areas.

Affected Area

The affected areas for direct and indirect effects to vegetative diversity are the lands administered by the three National Forests in the Ecogroup. This area represents the National Forest System lands where changes may occur to vegetation as a result of management activities or natural events. Some management areas may be highlighted in discussions, due to the significance of their contributions to specific vegetation groups or components.

The affected area for cumulative effects to vegetative diversity includes the lands administered by the three National Forests, and lands of other ownership both within and adjacent to these National Forest boundaries. Some discussions about specific vegetation groups or components may be more detailed, depending upon the significance of their contributions or effects by alternative.

CURRENT CONDITIONS

The national forests within the Southwest Idaho Ecogroup (Ecogroup) administer 6,688,000 acres of National Forest System lands (Boise - 2,268,000 ac., Payette - 2,308,000 ac., Sawtooth - 2,112,000 ac.). Forestlands, or areas that can support tree cover, occupy about 70 percent of the Ecogroup (Table V-2). Woodlands, grasslands, and shrublands cover an estimated 28 percent of the Ecogroup. An additional 2 percent are riparian areas. These numbers were derived from LANDSAT (Redmond et al. 1998, Edwards and Homer 1996).

Table V-2. Vegetation Group Percentages by Forest and Ecogroup

Vegetation Group	Percent of Boise NF	Percent of Payette NF	Percent of Sawtooth NF	Percent of Ecogroup
Forestlands	76	83	47	70
Woodlands	<1	0	4	<1
Shrublands	18	7	44	22
Grasslands	4	9	2	6
Riparian Areas	2	3	3	2
Other (water, rock, etc.)	<1	<1	<1	<1

Because vegetation is influenced by many factors—including climate, elevation, soils, topography, and latitude—the percentages of vegetation groups vary somewhat by Forest. The Sawtooth National Forest has a balance of forested and non-forested vegetation groups, whereas the Payette and Boise National Forests are strongly dominated by forested vegetation groups. Also, grassland vegetation groups are more prominent on the Payette National Forest, while the other two Forests have a greater predominance of shrublands. Part of this difference is attributable to different climatic conditions that favor one group over the other. More substantial differences can be found in individual management areas within each Forest. For instance, the Upper Secesh Management Area on the north end of the Payette National Forest is dominated by forestland while the Shoshone Creek Management Area on the south end of the Sawtooth National Forest has mostly shrubland and grassland vegetation.

Regional Current Conditions - Forested Vegetation

An analysis under the Interior Columbia Basin Ecosystem Management Project (ICBEMP) found that cover type distribution within the Basin's forested communities has changed significantly from the historical time period (ICBEMP 1997c). In the Dry Forest, in areas where less shade-tolerant ponderosa pine and Douglas-fir were seral due to the historically frequent nonlethal fire regime, later seral or climax species are currently more common. In addition, the large, single-storied structure often associated with this fire regime has declined. These changes have resulted from fire exclusion, changes in fire regimes through activities such as livestock grazing, and selective harvesting that has removed high-value early seral species like ponderosa pine. In many cases the landscape has become dominated by shade-tolerant, multi-storied stands where historically less shade-tolerant, single-storied stands dominated. Small and medium-sized stand classes have increased while large tree and grass/forb/seedling/shrub classes have decreased. Species composition in Dry Forest was found to be the least like historical of all the vegetation groups.

In the Moist Forest, species composition has also been altered. Like in the Dry Forest, selective harvesting and fire exclusion have reduced the early seral, shade-intolerant species such as ponderosa pine and western larch. Small and medium-sized stands have increased, as have multi-storied, shade-tolerant conditions.

The Cold Forest has changed the least compared to the other two groups. Species composition is more similar to historical conditions. However, stand densities, fuel loadings, and fire severity have changed, and the extent of whitebark pine is decreasing, due in part to fire exclusion and the introduction of white pine blister rust.

The current amount and distribution of snags and coarse wood across the Region also differ from historical conditions. The ICBEMP reports that basin-wide there are generally fewer snags than historically where timber management or salvage of dead trees (wildfire or insect killed) has occurred. Roads have also led to lower snag and downed wood levels in localized areas because of removal of dead trees for firewood or timber. The diversity of habitat created by a fire pattern mosaic is rarely present in managed stands (ICBEMP 2000a).

In areas where management has not occurred, there are often more snags than historically because of fire exclusion actions. Insect epidemics, disease outbreaks, and large, uncharacteristic wildfires have increased snag and coarse wood amounts in certain areas. Additional amounts of coarse woody material beyond historical conditions may not provide additional benefits because ecosystems do not always have the resources to exploit them, often due to moisture or temperature limitations (Graham et al. 1994). Excess material may also contribute to uncharacteristic fire effects, although green ladder fuels may create a greater risk of uncharacteristic fire effects than dead or down wood (Amaranthus et al. 1989).

Regional Current Conditions - Non-Forested Vegetation

For many decades it was believed that grasslands dominated much of the non-forested vegetation across the Columbia Basin and Ecogroup in pre-settlement times, and that sagebrush and pinyon-juniper invaded due to heavy grazing during Euro-American settlement. More recently, however, it has become evident that sagebrush was historically widespread and dominant (Paige and Ritter 1999, Tisdale and Hironaka 1981) and occurred as a patchwork of young and old stands across the landscape. Stands varied from expanses of single species to multi-species mosaics where sagebrush intermixed with other shrubs. Although pinyon-juniper woodlands were not as prevalent and widespread on the historic landscape as sagebrush, they shared similar age class variations. In many cases, grasslands are a seral stage in both group's successional progression. Therefore, any assessment of pinyon-juniper and sagebrush ecosystems must consider a landscape setting with a mosaic of ages and densities of both sagebrush and native understory species, and patterns that shift about on the landscape over time.

The ICBEMP (2000a) identifies broad-scale changes that have occurred within the Columbia River Basin. The most ecologically significant changes were in the shrublands, grasslands, and agriculture groups. The most substantial change in vegetation was the conversion of non-federal land to agricultural use. The introduction of exotic plants and their replacement of native cover types (especially drier cover types and riparian areas) may not be as substantial, but signals a significant trend that has future implications, given the known rates of spread (see *Non-native Plants* section). The ICBEMP Supplemental DEIS (ICBEMP 2000a) and the *Non-native Plants* section of this chapter contain additional information about current upland vegetation conditions.

ICBEMP (1997c) discussed substantial increases in agricultural, exotic herbland, and woodlands vegetation groups, and a corresponding decrease in shrublands in areas of the Ecogroup. In some areas, a significant decrease in grasslands has occurred. One thing to note, however, is that the conversion of shrublands to agricultural use has not been nearly as heavy on National Forest System lands as on private lands. Furthermore, cover types that include mountain big sagebrush, montane shrublands, and low sagebrush have not declined to the extent that Wyoming and basin big sagebrush have (ICBEMP1997c). Wyoming big sagebrush occurs only on a small fraction of one percent of the Sawtooth National Forest. Basin big sagebrush occurrence is more common. These cover types have been historically replaced by agricultural use off-Forest, making that which does occur on Forest important. The decline in the extent of the grassland vegetation group is most apparent in the decline of the perennial grass slopes cover type. This type is typically located in lower and drier sites that are dominated by bluebunch wheatgrass. The pinyon-juniper types found in the Ecogroup reflect a similar trend in the woodlands vegetation group of the Basin, in that there was no measurable change in geographic extent between historical and current. However, many woodland cover types and structural stages have encroached into other groups, notably the cool shrub and dry grass types.

The ICBEMP (2000a) discusses riparian woodlands, of which climax aspen would be a component. Mid-seral vegetation has increased in this group in the Interior Columbia Basin, to the detriment of late and early seral structural stages. These changes have come about primarily due to fire exclusion and the harvest of large trees.

Regional Current Conditions - Riparian Vegetation

The ICBEMP (2000a) has determined that the overall extent and continuity of riparian areas and wetlands has decreased, primarily because of conversion to agriculture, but also because of urbanization, transportation improvements, and stream channel modifications. Again, decreases off Forest have increased the importance and functions of riparian areas on National Forest System lands. However, most riparian areas on Forest Service or BLM administered lands are either "not meeting objectives", "non-functioning" or "functioning at risk", according to the ICBEMP study. Within riparian shrublands, there has been extensive conversion to riparian herblands and increases in exotic grasses and forbs. There is an overall decrease in large trees, and late seral vegetation in many riparian areas, determined by the amount and type of vegetation cover, has declined in most subbasins (ICBEMP 2000a). This decline has affected riparian ecosystem function. Often, lowered water tables resulting from heavy grazing pressure has modified or destroyed normal riparian vegetation (Blaisdell et al. 1982). On Forest Service or BLM administered lands, contributing factors include livestock grazing pressure, timber harvesting, fire management, conversion to crop and pastureland, road development, dams, and other water diversions; however, these areas have been a restoration priority for land management agencies and many areas are recovering (ICBEMP 2000a).

Ecogroup Current Conditions Of Forested Vegetation

Forest tree cover includes all conifer and hardwood tree species. Major tree species found on National Forest System lands within the Ecogroup are displayed in Table V-3.

Table V-3. Major Tree Species in the Ecogroup

Common Name	Scientific Name	Forest
grand fir	*Abies grandis*	Boise & Payette NF
subalpine fir (Rocky Mtn. subalpine fir)	*Abies lasiocarpa (Abies bifolia)*	Entire Ecogroup
Utah juniper	*Juniperus osteosperma*	Sawtooth NF
western larch	*Larix occidentalis*	Boise & Payette NF
Engelmann spruce	*Picea engelmannii*	Entire Ecogroup
whitebark pine	*Pinus albicaulis*	Entire Ecogroup
lodgepole pine	*Pinus contorta* var. *latifolia*	Entire Ecogroup
single leaf pinyon pine	*Pinus monophylla*	Sawtooth NF
ponderosa pine	*Pinus ponderosa*	Entire Ecogroup
quaking aspen	*Populus tremuloides*	Entire Ecogroup
black cottonwood	*Populus tricocarpa*	Entire Ecogroup
Rocky Mountain Douglas-fir	*Pseudotsuga menziesii* var. *glauca*	Entire Ecogroup

Table V-4 displays the PVG groups and their corresponding PVG numbers and the percent of each PVG on each Forest. This is broken into Wilderness and Non-Wilderness percentages for the Payette and Sawtooth National Forests, as these areas were modeled separately in predictive outcome modeling for the alternatives. Those labeled as N/A do not have any significant acres in that PVG, or were combined with other PVGs due to the low amounts of acreage. However, although a PVG may not comprise a large percentage of acreage on a particular Forest, it may still have a high value to biodiversity concerns. In some cases, a PVG may be particularly rare on the landscape or have a high percentage of acreage that was lost outside of National Forest System lands. Others may be particularly important to certain organisms, or what little remains is far outside the range of HRV, raising the importance of the small acreages on National Forest System lands. For these reasons, all PVGs are treated equally in the analysis, regardless of total acreage.

Table V-4. Forested Potential Vegetation Groups and Percent of Acres in Ecogroup Forests

Potential Vegetation Group	Payette Non-Wilderness	Payette Wilderness	Boise	Sawtooth Non-Wilderness	Sawtooth Wilderness
PVG 1 - Dry Ponderosa Pine/Xeric Douglas-fir	3.1	2.3	9.2	2.6	13.6
PVG 2 - Warm Dry Douglas-fir/ Moist Ponderosa Pine	13.1	17.5	24.7	0.8	2.8
PVG 3 - Cool Moist Douglas-fir	0.1	0.7	10.2	3.9	1.0
PVG 4 - Cool Dry Douglas-fir	2.7	3.1	11.1	21.6	6.2
PVG 5 - Dry Grand Fir	11.2	4.2	1.9	N/A	N/A
PVG 6 - Cool Moist Grand Fir	17.3	6.7	5.7	N/A	N/A
PVG 7 - Cool Dry Subalpine Fir	21.0	30.3	19.6	32.2	27.8
*PVG 8 - Cool Moist Subalpine Fir *PVG 9 – Hydric Subalpine Fir	13.5	12.3	N/A	N/A	N/A

Potential Vegetation Group	Payette Non-Wilderness	Payette Wilderness	Boise	Sawtooth Non-Wilderness	Sawtooth Wilderness
PVG 10 - Persistent Lodgepole Pine	6.1	3.3	16.0	18.7	26.9
PVG 11 - High Elevation Subalpine Fir	11.9	19.6	1.6	20.2	21.7

*PVGs 8 and 9 are combined due to low number of acres of each.

Table V-5 displays the seral status (accidental, seral, or climax) of the different overstory species within the PVGs. Status is based on descriptions from Steele et al. (1981) and Mehl et al. (1998). Conditions for each cover type or PVG can also be classified by tree size class and canopy closure. Doing this provides a more complete description of forested conditions, thus allowing a variety of issues to be addressed, including wildlife habitat, risk for uncharacteristic wildfire or insect epidemic, and potential for current and future management activities, including timber harvest and fire use. The size and canopy closure classes being used by the Ecogroup are described in Tables V-6 and V-7.

Table V-5. Status of Overstory Species in the Forested Potential Vegetation Groups

PVG	Aspen	Lodgepole Pine	Ponderosa Pine	Western Larch	Whitebark Pine	Douglas-Fir	Engelmann Spruce	Grand Fir	Subalpine Fir
1	seral	---	seral (climax)[2]	---	---	climax	---	---	---
2	seral	accidental	seral (climax)[2]	---	---	climax	---	---	---
3	seral	seral	seral	---	----	climax	---	---	---
4	seral	seral	seral	---	----	climax	---	---	---
5	seral	seral	seral	acc.	---	seral	accidental	climax	---
6	seral	seral	seral	seral	---	seral	seral	climax	accidental
7	seral	seral	accidental	acc.	accidental or minor seral	seral	seral	acc.	climax
8	seral	seral	---	seral	---	seral	seral	---	climax
9	seral	seral	---	---	---	acc.	seral-climax	---	climax
10	seral	seral[1]	---	---	seral	acc.	seral	---	climax
11	---	seral	---	---	seral and climax	---	---	---	climax

[1]Persistant seral species. Climax in one habitat type.
[2]Climax in some PVGs in the group.

Table V-6. Tree Size Classes

Grass/Forb/ Shrub/Seedling	Trees less than 1.0 inch in diameter, and areas without trees but capable of or previously having forest tree cover. All canopy closure densities, 0 to 100 percent, may be present.
Saplings	Trees range from 1.0 to 4.9 inches in diameter. Canopy closure is at least 10 percent.
Small Trees	Trees range from 5.0 to 11.9 inches in diameter. Canopy closure is at least 10 percent.
Medium Trees	Trees range from 12.0 to 19.9 inches in diameter. Canopy closure is at least 10 percent.
Large Trees	Trees are 20.0 inches or more in diameter. Canopy closure is at least 10 percent.

Table V-7. Canopy Closure Classes

Non-stocked or Non-forested	Non-forest vegetation cover types - may include some conifer tree cover but less than 10 percent total cover. May also include forest vegetation cover types, regardless of density, if in the grass/forb/shrub/seedling size class.
Low	Canopy closure ranges from 10 to 39 percent.
Moderate	Canopy closure ranges from 40 to 69 percent.
High	Canopy closure is 70 percent or greater.

<u>Reference Conditions</u>

Historical Range of Variability - Reference conditions for forested vegetation are based on estimates of historical range of variability (HRV), using the time prior to Euro-American settlement as a reference point (Morgan et al. 1994). Estimates of historical size classes and species composition are based on modeling conducted by Morgan and Parsons (2001) for PVGs in the Southern Idaho Batholith. Morgan and Parsons (2001) did not determine canopy closure (or other density measures) as part of the HRV modeling. Historical canopy closure was approximated using other sources (Steele et al. 1981, Sloan 1998) and examining average canopy closure classes from across different habitat types within a PVG. Historical estimates of snag and coarse woody debris numbers were derived from a variety of sources (Agee 2002, Brown et al. 2001, Harrod et al. 1998, Agee 1998, Flanagan et al. 1998, Roloff et al. 1998, Saab and Dudley 1998, Wisdom et al. 2000, Evans and Martens 1995, Blair and Servheen 1995, Bull et al. 1986, Graham et al. 1994, Wright and Wales 1993, Spahr et al. 1991, Thomas et al. 1979).

<u>HRV of Size Class</u> - In many PVGs, the large tree size class was historically the most common (Table V-8). This was particularly true in PVGs dominated by ponderosa pine. In PVGs 1, 2, and 5, almost half or more of the landscape was in large trees. In PVGs with different types of disturbance, for example lethal fire, a greater diversity of size classes occurred on the landscape.

Table V-8. Estimated Historical Distributions (in percent) of Size Classes For Forested Potential Vegetation Groups (Morgan and Parsons 2001)

Size Class	Potential Vegetation Group										
	1	2	3	4	5	6	7	8	9	10	11
Grass/forb/ seedling/shrub	0-6	0-7	1-14	0-10	0-10	5-16	0-20	3-19	2-20	11-25	8-21
Sapling	0-3	0-7	3-18	3-18	0-6	1-12	6-22	3-20	1-12	3-15	6-20
Small	0-4	0-4	4-33	4-35	0-11	1-27	10-49	9-34	12-30	39-59	5-29
Medium	1-6	3-22	10-45	16-59	0-16	4-45	14-34	28-44	28-44	11-27	8-44
Large	47-99	59-99	23-65	20-47	66-99	28-90	10-29	18-34	31-44	NA	14-43

<u>*HRV of Canopy Closure*</u> **-** Canopy closure historically varied among the PVGs (Table V-9). In some cases—such as in warm, dry PVGs 1 and 2—canopy closures were predominantly low due to the historical disturbances. More mesic sites like PVGs 8 and 9, which have historically longer disturbance return intervals, maintained more area in moderate and high canopy closure.

Table V-9. Estimated Historical Distribution (in percent) of Large Tree Size Class Canopy Closure Groups for Forested Potential Vegetation Groups

Canopy Closure Group	Potential Vegetation Group										
	1	2	3	4	5	6	7	8	9	10[1]	11
Low	100	85	15	3	35	0	3	0	0	0	7
Moderate	0	15	85	97	65	100	97	60	60	90	93
High	0	0	0	0	0	0	0	40	40	10	0

[1]Medium tree size class for PVG10.

<u>*HRV of Species Composition*</u> - Historically, many PVGs were dominated or co-dominated by seral species such as ponderosa pine, western larch, lodgepole pine, or whitebark pine (Table V-10). Seral species were often better adapted to disturbances that frequented the landscape, such as fire. For example, ponderosa pine, though seral in some of the habitat types, dominated the landscape primarily as a result of frequent, nonlethal fires in PVGs 1, 2, and 5. Where Douglas-fir was the climax species, it covered much less area. In more mesic PVGs, such as PVG 6 (moist grand fir), seral species were also common on the landscape. Ponderosa pine and western larch, both early seral species, occupied half or more of the landscape in some cases. Grand fir, the climax species, was not a dominant feature. In other PVGs, such as PVG 9 (hydric subalpine fir), Engelmann spruce and subalpine fir, which make up the climax community, were more dominant than seral lodgepole pine.

Table V-10. Estimated Range of Historical Species Composition (in percent) for Forested Potential Vegetation Groups (Morgan and Parsons 2001)

Species	Potential Vegetation Group										
	1	2	3	4	5	6	7	8	9	10	11
Aspen	--	--	1-11	4-13	--	--	6-11	--	--	--	--
Lodgepole pine	--	--	--	10-20	--	1-5	28-42	25-34	29-37	82-94	18-25
Ponderosa pine	96-99	81-87	24-41	--	80-88	23-41	--	--	--	--	--
Western larch	--	--	--	--	--	15-29	--	9-16	--	--	--
Whitebark pine	--	--	--	--	--	--	--	--	--	--	32-47
Douglas-fir	0-2	10-16	47-69	66-81	7-17	15-25	24-34	23-37	--	--	--
Grand fir	--	--	--	--	0-1	9-23	--	--	--	--	--
Engelmann spruce-Subalpine fir	--	--	--	--	--	0-5	15-26	21-34	57-66	--	26-42

HRV of Old Growth - The Payette National Forest 8-year Monitoring Report (USDA Forest Service 1996) identified a need to replace the definition of old growth used in the 1988 Payette Forest Plan with an ecologically based definition for each forest cover type. The new definition would provide for a range of old growth habitat conditions over broad areas to meet the needs of groups of wildlife species associated with old growth. The former Payette Plan uses the old growth definition put forth in Thomas et al. (1979) that was essentially developed for, and applies to, mixed conifer or grand fir stands. The definition describes tree size (> 21 inches d.b.h.) and density (15 trees/ac.), snag size and density, canopy levels and crown closure, and "some trees with heart rot." The 1990 Boise Forest Plan defines old growth as "a stand of trees that is past full maturity and showing decadence; the last stage in forest succession." The 1987 Sawtooth Forest Plan defines old growth as "a stand of trees that is past maturity and showing decadence."

During development of the Analysis of the Management Situation, a number of concerns related to the definition of old growth were identified:

- Inconsistent definitions add to the confusion and subjectivity attached to old growth. People tend to have their own picture of what old growth is, a picture that rarely corresponds to late successional conditions across a variety of forested vegetation types.

- Management direction typically treats old growth as a separate entity, rather than as one facet of forested vegetation related to habitat and species viability.

- Definitions and direction do not incorporate recent research on old growth components identified for a wide range of forest vegetation types.

- Definitions and direction do not incorporate recent research on structural stages and other individual vegetation components related to species habitat needs.

- Definitions and direction do not incorporate recent research on late successional structural stages and disturbance regimes.

It is recognized that any strategy to address these concerns should apply to forested vegetation as a whole, not just one successional stage. It is also critical that structure and density desired conditions should address all forested vegetation types, not just mixed conifer or lodgepole pine, to more closely emulate the regional old growth study that was done by Hamilton (1993). Based on recent research encompassing the central Idaho batholith, old growth as a late successional stage was important, but not extensive on the historic landscape (Morgan and Parsons 2001). However, the large tree component was common (Morgan and Parsons 2001, Wisdom et al. 2000). The following table (Table V-11) shows the estimated percents of forested landscapes in the central Idaho batholith that were historically occupied by stands in the large tree size class (medium class for PVG 10 – persistent lodgepole pine), and by stands with late successional old growth characteristics. Estimates were developed for each of the 11 potential vegetation groups in the Ecogroup area.

Table V-11. Estimated Percent of Historical Large Tree Size Class (Medium Class for PVG 10) and Old Growth, for the Central Idaho Batholith (Morgan and Parsons 2001)

Indicator	Potential Vegetation Group										
	1	2	3	4	5	6	7	8	9	10	11
Percentage of PVG historically in the large tree size class (mean value)	91.0	80.0	41.0	34.0	84.0	56.0	21.0	21.0	37.0	19.0	27.0
Percentage of PVG estimated to represent old growth	0	0	8.5	8.4	0.4	2.5	4.0	5.5	26.0	0	1.2

Note: Large tree size class refers to stands where the overstory trees average 20 inches diameter or greater. Medium tree size class refers to stands where the overstory trees average between 12 and 19.9 inches diameter.

The main reason for the differences between large tree percents and old growth percents is that vegetation structural conditions in central Idaho develop in conjunction with disturbance processes (fire, insect, disease, wind, etc.) and climate variations. Conversely, late successional old growth characteristics develop in the absence of frequent disturbances (Hamilton 1993). In central Idaho, disturbance is a common occurrence. In historical times, forested stands in lower-elevation vegetation groups likely developed large trees and relatively open canopies during mid-successional stages, and these conditions were maintained over time by frequent low-intensity fire disturbance. Dense stands and decadence typically associated with late successional stage conditions (old growth) rarely occurred. Thus, historical stands dominated by large and old seral trees like ponderosa pine could be considered old forest, but not as "old growth" under any definition that incorporates a full set of late successional conditions.

As Mehl et al. (1998) points out:

> "Specific measures of old growth characteristics have not been developed for the understory fire maintained systems. The large tree vegetation growth stage within the understory fire regime is a fire maintained system that is usually dominated by seral species in a late growth stage. However, if species composition and tree densities meet the requirement of the understory fire/large tree vegetation growth stage, it is likely to closely represent "old growth" conditions, as we currently understand them. The overall point being that old growth forest and climax forest can be different entities".

It should also be noted that Morgan and Parsons (2001) expressed two concerns about their estimation of old growth represented in historical stands:

> "First, definitions of OG [old growth] vary. For instance, many would designate all large tree, single-storied stands of ponderosa pines old growth on habitat type classes that would support them. We use the definitions of OG developed by Mehl. et al. (1998) [*Characteristics of Old-Growth Forests in the Intermountain Region* compiled by Ronald C. Hamilton, April 1993]. Second, while we model these as a percentage of the large tree multi-story class dominated by the climax tree species (e.g. grand fir on the two grand fir habitat type classes), . . . there is not [a] clearly defensible way to estimate what that percentage should be" (Morgan and Parsons, 2001).

Morgan and Parsons (2001) recommend that users develop other means of estimating the historical range of variability of old growth forests. However, their estimates are still the best available on old growth amounts for the central Idaho batholith. Furthermore, the inability to defensibly estimate old growth amounts influenced the Forests' decision to develop direction and analysis that considers the structural and functional components of old growth by providing for the large tree size class at various levels of canopy closures, together with other components, such as snags and coarse woody debris. This coarse-filter approach assumes the functional components are present when the structural components are provided, rather than relying on a relative estimate of the amount of old growth.

The term "old forest" is used in the ICBEMP's classification (ICBEMP 2000a). The ICBEMP classification describes old forest with either single or multi-story structure. The old forest structural stages, as described in ICBEMP, are a part of the large tree size class described in our PVGs, except PVG 10 (which does not develop into the large tree size class), rather than a pure estimate of the amount of old growth that may have existed on the landscape. Using this approach, the inconsistent definition and interpretation of old growth is no longer an issue. By relying on vegetation and habitat components, we also can consider the lower-elevation (understory fire regime or non-lethal/mixed 1 fire regime) vegetation groups with mid-seral old forest. Therefore, rather than evaluate the amounts of old forest or old growth, vegetation components are used instead: tree size class, canopy closure (stand density), species composition, snags by size class, amount of coarse woody debris, and the percent of area (5th field hydrologic unit) occupied by the different tree size classes. Additional discussion on old forest/old growth with regards to species viability is provided in this Chapter in the *Terrestrial Habitat and Species* section.

<u>*HRV of Snags and Down Logs*</u> - Historically, the presence of snags, hollow and dead portions of live trees, and woody debris depended on a variety of factors, including vegetative patterns and distribution, site potential, and disturbance regimes. The major agents of disturbance are fires, winds, insects, diseases, and accelerated mass soil and debris movements. These disturbances, along with forest stand development and plant succession, help create the coarse woody debris that is part of the forest (Spies and Cline 1988). Individual trees have different characteristics that produce diversity within the forest; the cause of death determines the diversity of the structural and functional roles served by the dead tree, which change when the snag falls to the forest floor (Maser et al. 1988).

Snag and log quantities and conditions are highly variable in both space and time, which makes them difficult to characterize. Thus, few attempts have been made to determine actual historical numbers of snags and coarse woody debris. Harrod et al. (1998) developed a process for estimating historical snag densities in dry forests of the eastern Cascades. Their underlying premise was that snag densities in historically dry forests were predictable, based upon a historical disturbance regime of frequent, low intensity fire. These types of fires produced small patches of even-aged, predominately large, ponderosa pine. They assumed that tree mortality was continuous and occurred in small patches as a result of fire, insect, and disease activity.

Agee (2002) discusses how coarse woody debris varied significantly with historic fire regime. In low-severity (non-lethal) fire regimes, frequent fires consumed the dry logs and snags; stable but very low levels of coarse woody debris were characteristic of these fire regimes. Large snags were consistently produced, but had a short life span. Moderate severity (mixed 1/mixed 2) fire regimes maintained variable but consistently high levels of coarse woody debris. The high-severity (lethal) fire regimes had the classic “boom and bust” dynamic. After a stand replacement event, coarse woody debris would be abundant, but new input of large material would be limited until the new stand was large enough to contribute functional size classes.

Stevens (1997) developed a similar model for forests in British Columbia. With frequent, stand-maintaining fires, there are small fluctuations in snags and coarse woody debris. This compares to ecosystems with more variable fire-regimes, hence more variable fluctuations of inputs and outputs. Historical levels of snags and coarse woody debris with high intensity and lethal fire regimes are much more difficult to quantify and depend on stand densities that develop after any one disturbance, the kinds and amounts of mortality that occurs before and from the disturbance event, and a host of other variables (Spies et al. 1988, Clark et al. 1998).

Historical quantities and conditions of snags and coarse woody debris would mirror the vegetative species that occurred historically on a site and represent the kinds of habitats and mortality agents that operated there. Harrod et al. (1998) assumed that, in order to determine historical snag density, the historical stand structure must first be modeled. Snags occur in clumps due to the localized impacts of the disturbance agents such as disease, insects, fire, or flooding (Bull et al. 1997). Larger-diameter snags are generally retained longer than smaller-diameter snags (Bull 1983, Morrison and Raphael 1993, Forbes 1994), resulting in snags being distributed on a landscape scale in a variety of decay classes, due to patch dynamics and differential decay rates. Agee (1998) and Harrod et al. (1998) reported that, under historical nonlethal fire regimes, the amount of snags and downed coarse woody debris was low, but the size of the material was large, and the amount on a less than 1 acre basis was stable, based on the extent of fire effects. For mixed1 and mixed2 fire regimes, the amount of snags and coarse woody debris was variable, with sizes representing the diversity of stands, and amounts on a 1-600 acre basis were stable, again based on the extent of fire effects. For lethal fire regimes, snags and coarse woody debris were high immediately following disturbance, the size of the material was representative of the stands that burned, and the amount on a greater than 600 acre basis was stable. Further information on fire intervals, fire intensities, and vegetation patterns are found in Table 3-2 describing fire regimes of the Ecogroup.

Root ectomycorrhizae depend on soil organic matter and are important to a conifer's ability to acquire nutrients. Graham et al. (1994) developed conservative recommendations for leaving coarse woody debris after timber harvesting to ensure enough organic matter to maintain long-term forest productivity. Brown et al. (2001) suggest examining Forest inventory and stand exam data as a means of approximating historical large downed woody fuel loadings. They also suggest that a variety of sources of information about the roles of coarse woody debris in the forest and its historical dynamics should be considered in making recommendations of desirable biological benefits without creating an unacceptable fire hazard. This analysis took a similar approach and arrived at historical estimates by PVG, based on a variety of literature (cited above) for both snag amounts and tonnage of coarse woody debris, as displayed in Tables V-12 and V-13.

Table V-12. Estimated Historical Range of Snags per Acre for Potential Vegetation Groups in the Ecogroup

Diameter Group	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11
10" – 20"	0.4-0.5	1.8-2.7	1.8-4.1	1.8-2.7	1.8-5.5	1.8-5.5	1.8-5.5	1.8-7.5	1.8-7.5	1.8-7.7	1.4-2.2
> 20"	0.4-2.3	0.4-3.0	0.2-2.8	0.2-2.1	0.4-3.5	0.2-3.5	0.2-3.5	0.2-3.0	0.2-3.0	N/A	1.4-2.2
Total	0.8-2.8	2.2-5.7	2.0-6.9	2.0-4.8	2.2-9.0	2.0-9.0	2.0-9.0	2.0-10.5	2.0-10.5	1.8-7.7	2.8-4.4
Minimum Height	**15'**	**30'**	**30'**	**30'**	**30'**	**30'**	**30'**	**30'**	**30'**	**15'**	**15'**

Table V-13. Estimated Historical Range of Coarse Woody Debris, in Tons Per Acre, and Amounts in Large Size Classes for Potential Vegetation Groups in the Ecogroup

Indicator	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG10	PVG11
Dry weight (Tons per ac.) in Decay Classes I and II	3 – 10	4 – 14	4 – 14	4 – 14	4 – 14	4 – 14	5 – 19	5 – 19	5 – 19	5 – 19	4 – 14
Distribution >15" DBH	>75%	>75%	>65%	>65%	>75%	>65%	>50%	>25%	>25%	>25%	>25%

Desired Conditions (DCs)
Historical range of variability (HRV) is useful as a reference for setting general management goals, comparing current conditions, and developing desired conditions (an expression of ecosystem conditions preferred by stakeholders and managers), and historical variability clarifies management direction (Landres et al. 1999). The use of these concepts is not necessarily an attempt to mimic or recreate the processes that occurred on a site very long ago, but rather an attempt to improve our understanding about the ecological context of an area and the landscape-scale effects of disturbance (Landres et al. 1999). This understanding may then be used to make existing and future conditions more relevant and variable, and therefore ecologically sustainable (Covington et al. 1994, Wallin et al. 1996).

Size and Canopy Closures – DCs for forested vegetation were developed for each alternative using HRV as the anchor (Morgan et al. 1994). The DCs reflect the intent and theme of the alternatives. DCs were defined for tree size class, canopy closure, species composition, snags, and coarse woody debris for all PVGs, and they describe how much of the PVG, within a range, should fall into that condition. More refined DCs, used in the modeling process, were developed by PVG for combinations of the endpoint (largest) tree size class and various canopy closures, and for the grass/forb/seedling/ shrub stage for the SPECTRUM modeling (see Appendix B for more information on modeling). These more refined DCs are used in the analysis process here.

Alternative 1B – This Alternative represents the current Forest Plan direction as amended by Pacfish/Infish, and it incorporates terms and conditions from recent Biological Opinions for species (steelhead trout and bull trout) listed as threatened under the Endangered Species Act. By PVG, the value used for the endpoint tree size class was the low end of HRV, or 10 percent, whichever was greater (Figure V-1). The 10 percent represents the Wildlife Management Requirement (WMR) in this alternative (see *Terrestrial Habitat and Species* section). No PVG fell below 10 percent although PVG 7 equaled it (Table V-8). The endpoint tree size class distribution into canopy closures is intended to reflect the stand density levels most amenable to managing for commodities on suited timberlands (Table V-14). In general, a greater proportion of the endpoint tree size class was distributed into the moderate (or in some cases, high) canopy closure classes than occurs under HRV (Table V-9).

Figure V-1. The Relative Relationship of the Endpoint Tree Size Class Desired Conditions for Forested Vegetation Modeling

```
                         Historical Range of Variability
              Low end                                                    High end
              <------------------------------------------------------------->
|             |          |  |          |     |
Alt. 5     Alt. 1B    Alt. 7 Alt. 2   Alt. 6  Alt. 3, Alt. 4
```

Some PVGs may vary in the relative ranking of alternatives shown here.

Table V-14. Distribution (in percent) of the Endpoint Tree Size Class And Canopy Closure Groups for Forested Potential Vegetation Groups For Alternatives 1B and 5

Canopy Closure Group	Potential Vegetation Group										
	1	2	3	4	5	6	7	8	9	10[1]	11
Low	100	13	0	0	13	0	33	0	0	0	67
Moderate	0	88	100	100	88	100	67	40	40	43	33
High	0	0	0	0	0	0	0	60	60	57	0

[1]Medium tree size class for PVG10, as lodgepole pine typically do not attain large size.

Alternative 2 – The intent of this alternative is to restore resources with low resiliency and integrity to reduce risks associated with uncharacteristic disturbance. Resources that are resilient and resistant receive custodial management or no treatment over the short term. The DC is interpreted to be halfway between the low end and the reported mean of HRV, but not less than 20 percent, which is the Wildlife Management Requirement (see the *Terrestrial Habitat and Species* section). This was deemed the most appropriate interpretation to meet the intent of resilient and resistant. All PVGs but 7, 8/9, and 10 were above the WMR; therefore 20 percent was used for these PVGs. Canopy closures were distributed to reflect HRV for each PVG (Table V-9).

Alternative 3 – This alternative was designed to achieve or approach HRV and is focused on restoring conditions. The mean of HRV appears to best represent the intent of this alternative. No PVG fell below the WMR. Canopy closures were distributed according to Table V-9.

Alternative 4 – This alternative minimizes human-caused disturbance over the short term while allowing ecological processes to dominate. Therefore, the mean of the HRV also appears to best represent the intent of this alternative, as ecological processes were assumed to restore current conditions over time. Canopy closures were distributed according to Table V-9.

Alternative 5 – Alternative 5 focuses on production of goods and services within sustainable limits of the ecosystem. Forested vegetation is managed for growth and yield on suited timberlands. One-half the low end of the endpoint tree size class HRV, but not less than 20 percent (the Wildlife Management Requirement), was used. All PVGs except 7, 8/9, 10, and 11 were above the WMR; 20 percent was used for PVGs 7, 8/9, 10, and 11. This was assumed to be sustainable for all ecosystems, as it is still relative to HRV and meets wildlife needs. Canopy closures were distributed according to Table V-14.

Alternative 6 – The intent of this alternative is to reduce human-caused risks to ecological values associated with inventoried roadless and unroaded areas by minimizing management activities. Areas outside those listed above are managed to maintain or improve resources that are resistant and resilient in order to reduce the risks and effects of uncharacteristic disturbance. The large tree DC for this alternative is weighted based on acreages of each PVG both within Inventory Roaded Areas (IRAs) and unroaded areas, and the acres outside of IRAs and unroaded areas.

The following rule set was applied:
- Within IRAs and unroaded areas, use the mean HRV value.
- Outside of IRAs and unroaded areas, use the low end HRV value.

Generally, this alternative was between Alternative 2 and Alternatives 3 and 4. Although it varied by PVG and by Forest, it was usually closer to the mean of HRV than to Alternative 2, as displayed in Figure V-1. In some cases, notably PVG 3 for the Payette National Forest and PVG 2 on the Sawtooth National Forest, it exceeded the mean of HRV. Canopy closures were distributed according to Table V-9.

Alternative 7 – The intent of this alternative is to combine a number of key components of other alternatives, such as protection of listed species, conservation of roadless areas, restoration and maintenance of high priority habitat and watershed conditions, reduction of large-scale fire and insect hazard, and production of socio-economic goods and services. The DC was somewhat more complex than under other alternatives in order to appropriately represent the varied themes of Alternative 7. Similar to Alternative 6, a weighted desired condition for large trees is based on acreages of each PVG both within IRAs and acres outside of IRAs. Furthermore, this varied by PVG fire regimes, to better represent the intent of this alternative. The following rule set was applied:

Within Inventoried Roadless Areas

PVGs 1, 2, 3, 5, and 6 (non lethal and mixed 1 fire regimes)
- Large tree desired condition midway between the mean and the high end of HRV
- Canopy closure same as Alternatives 2, 3, and 4.

PVGs 4, 7, 8, 9, 10, and 11 (lethal and mixed 2 fire regimes)
- Large tree desired condition the mean of HRV
- Canopy closure same as Alternatives 2, 3, and 4.

Outside of Inventoried Roadless Areas

PVGs 1, 2, 3, 5, and 6 (non lethal and mixed 1 fire regimes)
- Large tree desired condition half of low end of HRV range (when combined with the PVG within inventoried roadless areas must have at least 20 percent large trees.
- Canopy closure same as Alternatives 1B and 5.

PVGs 4, 7, 8, 9, 10, and 11 (lethal and mixed 2 fire regimes)
- Large tree desired condition low end of HRV range.
- Canopy closure same as Alternatives 1B and 5.

This generally results in an alternative that is between Alternative 1B and Alternative 6 within the HRV. Although they varied by PVG and by Forest, several of the PVGs were usually below Alternative 2, while others were above Alternative 2, so the location as displayed in Figure V-1 is an approximation.

This quantitative DC for the modeling allows for the full range of conditions that may occur to meet the varied themes within Alternative 7. The approach in developing the modeling DC was to use the two contrasting ranges of vegetative conditions that could occur by conserving Roadless Areas and providing for commodity production outside Roadless Areas. For implementation, this alternative has a separate desired condition range for the MPC 5.2 areas (commodity production emphasis) and another range for areas outside of MPC 5.2. The intent for the modeling was to estimate the two desired condition ranges for implementation in concert with the various themes within Alternative 7.

Table V-15 displays the desired conditions for each of the three Ecogroup Forests.

Table V-15. Desired Condition by Forest and Alternatives, Expressed as a Percent of Total Acreage

PVG	Payette National Forest							
	Size/Canopy Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	G/F/S/S	2.0	2.0	2.0	1.0	2.0	1.0	6.0
	Large Low	47.0	69.0	91.0	91.0	24.0	81.0	71.0
	Large Mod.	0	0	0	0	0	0	0
	Large High	0	0	0	0	0	0	0
PVG 2	G/F/S/S	6.0	3.0	3.0	2.0	8.0	2.0	7.0
	Large Low	8.0	60.0	68.0	68.0	4.0	65.0	26.0
	Large Mod.	51.0	11.0	12.0	12.0	26.0	11.0	31.0
	Large High	0	0	0	0	0	0	0
PVG 3	G/F/S/S	11.0	10.0	7.0	4.0	12.0	5.0	8.0
	Large Low	0	5.0	6.0	6.0	0	8.0	7.0
	Large Mod.	23.0	27.0	35.0	35.0	20.0	44.0	44.0
	Large High	0	0	0	0	0	0	0
PVG 4	G/F/S/S	5.0	4.0	4.0	3.0	6.0	3.0	14.0
	Large Low	0	1.0	1.0	1.0	0	1.0	1.0
	Large Mod.	20.0	26.0	33.0	33.0	20.0	32.0	32.0
	Large High	0	0	0	0	0	0	0
PVG 5	G/F/S/S	7.0	3.0	3.0	3.0	10.0	3.0	5.0
	Large Low	9.0	26.0	29.0	29.0	4.0	28.0	15.0
	Large Mod.	57.0	49.0	55.0	55.0	29.0	52.0	47.0
	Large High	0	0	0	0	0	0	0
PVG 6	G/F/S/S	11.0	9.0	7.0	4.0	12.0	5.0	8.0
	Large Low	0	0	0	0	0	0	0
	Large Mod.	28.0	42.0	56.0	56.0	20.0	50.0	39.0
	Large High	0	0	0	0	0	0	0
PVG 7	G/F/S/S	11.0	12.0	9.0	5.0	10.0	7.0	15.0
	Large Low	3.0	1.0	1.0	1.0	7.0	1.0	2.0
	Large Mod.	7.0	19.0	20.0	20.0	13.0	19.0	18.0
	Large High	0	0	0	0	0	0	0
PVG 8/9	G/F/S/S	11.0	8.0	7.0	5.0	14.0	6.0	17.0
	Large Low	0	0	0	0	0	0	0
	Large Mod.	7.0	12.0	13.0	13.0	8.0	13.0	12.0
	Large High	11.0	8.0	8.0	8.0	12.0	8.0	9.0

PVG	Payette National Forest							
	Size/Canopy Classes	**Alt. 1B**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
*PVG 10	G/F/S/S	15.0	21.0	14.0	6.0	10.0	10.0	22.0
	Med. Low	0	0	0	0	0	0	0
	Med. Mod.	5.0	18.0	18.0	18.0	5.0	18.0	16.0
	Med. High	6.0	2.0	2.0	2.0	6.0	2.0	4.0
PVG 11	G/F/S/S	16.0	16.0	11.0	5.0	16.0	8.0	15.0
	Large Low	9.0	1.0	2.0	2.0	13.0	2.0	3.0
	Large Mod.	5.0	20.0	25.0	25.0	7.0	24.0	23.0
	Large High	0	0	0	0	0	0	0
PVG	**Boise National Forest**							
	Size/Canopy Classes	**Alt. 1B**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
PVG 1	G/F/S/S	2.0	2.0	2.0	1.0	2.0	1.0	6.0
	Large Low	47.0	69.0	91.0	91.0	24.0	81.0	69.0
	Large Mod.	0	0	0	0	0	0	0
	Large High	0	0	0	0	0	0	0
PVG 2	G/F/S/S	6.0	3.0	3.0	2.0	8.0	2.0	7.0
	Large Low	8.0	60.0	68.0	68.0	4.0	65.0	21.0
	Large Mod.	51.0	11.0	12.0	12.0	26.0	11.0	31.0
	Large High	0	0	0	0	0	0	0
PVG 3	G/F/S/S	11.0	10.0	7.0	4.0	12.0	5.0	9.0
	Large Low	0	5.0	6.0	6.0	0	6.0	2.0
	Large Mod.	23.0	27.0	35.0	35.0	20.0	35.0	29.0
	Large High	0	0	0	0	0	0	0
PVG 4	G/F/S/S	5.0	4.0	4.0	3.0	6.0	3.0	14.0
	Large Low	0	1.0	1.0	1.0	0	1.0	1.0
	Large Mod.	20.0	26.0	33.0	33.0	20.0	29.0	28.0
	Large High	0	0	0	0	0	0	0
PVG 5	G/F/S/S	7.0	3.0	3.0	3.0	10.0	3.0	6.0
	Large Low	9.0	26.0	29.0	29.0	4.0	27.0	10.0
	Large Mod.	57.0	49.0	55.0	55.0	29.0	49.0	41.0
	Large High	0	0	0	0	0	0	0
PVG 6	G/F/S/S	11.0	9.0	7.0	4.0	12.0	5.0	9.0
	Large Low	0	0	0	0	0	0	0
	Large Mod.	28.0	42.0	56.0	56.0	20.0	46.0	33.0
	Large High	0	0	0	0	0	0	0
PVG 7	G/F/S/S	11.0	12.0	9.0	5.0	10.0	7.0	15.0
	Large Low	3.0	1.0	1.0	1.0	7.0	1.0	1.0
	Large Mod.	7.0	19.0	20.0	20.0	13.0	19.0	19.0
	Large High	0	0	0	0	0	0	0
PVG 8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*PVG 10	G/F/S/S	15.0	21.0	14.0	6.0	10.0	10.0	22.0
	Med. Low	0	0	0	0	0	0	0
	Med. Mod.	5.0	18.0	18.0	18.0	9.0	18.0	16.0
	Med. High	6.0	2.0	2.0	2.0	11.0	2.0	4.0
PVG 11	G/F/S/S	16.0	16.0	11.0	5.0	16.0	8.0	14.0
	Large Low	9.0	1.0	2.0	2.0	13.0	2.0	2.0
	Large Mod.	5.0	20.0	25.0	25.0	7.0	25.0	25.0
	Large High	0	0	0	0	0	0	0

PVG	Sawtooth National Forest							
	Size/Canopy Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	G/F/S/S	2.0	2.0	2.0	1.0	2.0	1.0	2.0
	Large Low	47.0	69.0	91.0	91.0	24.0	81.0	88.0
	Large Mod.	0	0	0	0	0	0	0
	Large High	0	0	0	0	0	0	0
PVG 2	G/F/S/S	6.0	3.0	3.0	2.0	8.0	2.0	6.0
	Large Low	8.0	60.0	68.0	68.0	4.0	71.0	41.0
	Large Mod.	51.0	11.0	12.0	12.0	26.0	12.0	28.0
	Large High	0	0	0	0	0	0	0
PVG 3	G/F/S/S	11.0	10.0	7.0	4.0	12.0	5.0	8.0
	Large Low	0	5.0	6.0	6.0	0	7.0	5.0
	Large Mod.	23.0	27.0	35.0	35.0	20.0	41.0	39.0
	Large High	0	0	0	0	0	0	0
PVG 4	G/F/S/S	5.0	4.0	4.0	3.0	6.0	3.0	14.0
	Large Low	0	1.0	1.0	1.0	0	1.0	1.0
	Large Mod.	20.0	26.0	33.0	33.0	20.0	30.0	30.0
	Large High	0	0	0	0	0	0	0
PVG 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	G/F/S/S	11.0	12.0	9.0	5.0	10.0	7.0	15.0
	Large Low	3.0	1.0	1.0	1.0	7.0	1.0	1.0
	Large Mod.	7.0	19.0	20.0	20.0	13.0	19.0	19.0
	Large High	0	0	0	0	0	0	0
PVG 8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*PVG 10	G/F/S/S	15.0	21.0	14.0	6.0	10.0	10.0	21.0
	Med. Low	0	0	0	0	0	0	0
	Med. Mod.	5.0	18.0	18.0	18.0	9.0	18.0	15.0
	Med. High	6.0	2.0	2.0	2.0	11.0	2.0	5.0
PVG 11	G/F/S/S	16.0	16.0	11.0	5.0	16.0	8.0	15.0
	Large Low	9.0	1.0	2.0	2.0	13.0	2.0	3.0
	Large Mod.	5.0	20.0	25.0	25.0	7.0	24.0	23.0
	Large High	0	0	0	0	0	0	0

*PVG 10 refers to Medium Tree Size Class

Species Composition – The desired condition is the same as the historical estimates for all alternatives.

Snags and Coarse Woody Debris – The desired condition is the same as the historical estimates for all alternatives.

Old Forest/Old Growth – There are no desired conditions other than those already established for size class, tree canopy closures, species composition, snags, and coarse woody debris.

Wilderness Areas – For the purposes of modeling, designated wilderness areas were treated separately from areas outside of designated wilderness. The desired condition for all areas inside of designated wilderness, for all components, is the same as the historical estimates in any alternative. The desired condition therefore, is the mean of HRV. This better reflects the desired condition for areas inside of designated wilderness, regardless of the alternative.

Current Conditions for Forested Vegetation

All alternatives start with the same current conditions. Forested vegetation is described using habitat types, which use potential climax vegetation as an indicator of environmental conditions. Individual habitat types are named according to the dominant climax overstory species in conjunction with the dominant understory species. At the level of the Forest Plan, forested habitat types have been further grouped into PVGs that share similar environmental characteristics, site productivity, and disturbance regimes. The purpose of these groupings is to simplify the description of vegetative conditions for use at the broad scale. For additional details on specific habitat types and groupings into PVGs, see Mehl et al. (1998) and Steele et al. (1981).

Forested PVGs were mapped using a modeling process. The Forest was divided into groupings of 5th field hydrological units (HUs) that shared similar large-scale environmental characteristics, such as climate and geology. Each of these 5th field HU groups was modeled separately. Models were based primarily on slope, aspect, elevation, and land type association groups. Other information was brought into developing modeling rules within a 5th field HU group depending on vegetation present in these groups and the availability of information. This additional information included forest inventory information, forest timber strata, cover type information, existing habitat type mapping, cold air drainage models, and any other information that may have assisted with the development of modeling rules. Where necessary, some field verification did take place. Modeling rules were developed and processed in Arc Grid. Draft maps were sent to District personnel familiar with the area for review, and refinements were made as needed.

Current conditions for forested vegetation size class, canopy closure, and species composition, were determined from the remote sensing classification (LANDSAT) developed at the University of Montana (Redmond et al. 1998). Due to large wildland fires that occurred in July through September of 2000, these conditions were updated using burn intensity to determine the current size and canopy closure class.

On the Minidoka Ranger District of the Sawtooth National Forest, a different method was used to map PVGs. This area is not in the Idaho Batholith, therefore, environmental characteristics are substantially different from the rest of the Ecogroup. Furthermore, the LANDSAT remote sensing classification of existing vegetation developed at the University of Montana (Redmond et al. 1998) did not include areas south of the Snake River (Minidoka Ranger District). Ranger District personnel mapped all conifer stands. Stands were delineated on aerial photos and orthophoto quadrangles. Information associated with each stand was entered in the Forest's database (Rocky Mountain Resource Information System – RMRIS) and, as a minimum, included habitat type, cover type, tree size class and canopy closure class. Habitat types that share similar environmental characteristics, site productivity and disturbance regimes were grouped into PVGs. These PVGs are equivalent to the PVGs identified for the rest of the Forest, although they are composed of different habitat types.

Comparison of Current Condition with Historical Estimates

Size Class - For each Forest, current size class by PVG was compared to the estimate of the mean of HRV as described by Morgan and Parsons (2001), since HRV represents the anchor by which to compare current conditions and their ability to achieve desired conditions. The mean is used, rather than the entire range, to make comparisons to the HRV, since the range is not appropriate for this purpose. Rare, extreme events define these bounds, and spatial and temporal limits usually are not well defined in sufficiently explicit terms to make comparisons with the range (Landres et al. 1999). These values vary between PVGs. Each PVG is compared with the historical estimate of size class and the difference calculated. A mathematical comparison is applied to determine whether or not the size classes deviate from the estimated value of historical. This was analyzed for two size classes together, the grass/forb/shrub/seedling (G/F/S/S) and the large tree, as these are the two components for which there are also modeled desired conditions developed for each alternative. Other size classes are assumed to fall somewhere in between these two. This analysis assists with the determination of whether or not the current range of size classes is within the historical range, or if it deviates from historical estimates. Areas within designated wilderness and outside of designated wilderness are evaluated separately, as the modeling process used to predict outcomes over time under the different alternatives treated these areas separately due to the differences in desired conditions.

Payette National Forest - Table V-16 represents the current condition on the Payette National Forest, for all areas outside of designated wilderness, as a percent of acres in each size class, and compares this to estimates of the mean of HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV. All of the PVGs, except PVG 10, have too many acres in the G/F/S/S size class, and too few acres in the large size class. PVG 10 does not produce large trees, so the G/F/S/S and medium tree size class were used. Medium size tree class was below the estimated historical.

Table V-16. Current Conditions for Tree Size Class on the Payette National Forest, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	G/F/S/S Large	19.3 16.4	2.0 91.0	+17.3 -74.6	Out
PVG 2	G/F/S/S Large	28.1 18.8	3.0 80.0	+25.1 -61.2	Out
PVG 3	G/F/S/S Large	22.8 21.7	7.0 41.0	+15.8 -19.3	Out
PVG 4	G/F/S/S Large	29.4 14.8	4.0 34.0	+25.4 -19.2	Out
PVG 5	G/F/S/S Large	22.5 23.5	3.0 84.0	+19.5 -60.5	Out
PVG 6	G/F/S/S Large	20.0 25.0	7.0 56.0	+13.0 -31.0	Out
PVG 7	G/F/S/S Large	26.7 10.9	9.0 21.0	+17.7 -10.1	Out

PVG	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 8/9	G/F/S/S Large	28.9 10.6	7.0 21.0	+21.9 -10.4	Out
PVG 10	G/F/S/S *Medium Tree	13.8 36.7	14.0 20.0	-0.2 -16.7	Out
PVG 11	G/F/S/S Large	31.7 4.4	11.0 27.0	+20.7 -22.6	Out

*PVG 10 refers to Medium Tree Size Class

Table V-17 represents the current condition on the Payette National Forest, for designated wilderness areas, as a percent of acres in each size class, and compares this to estimates of the mean of HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV, except for PVG 10. All of the PVGs, except PVG 10, have too many acres in the G/F/S/S size class, and too few acres in the large size class. PVG 10 does not produce large trees, so the G/F/S/S and medium tree size class were used. Medium size tree class was slightly above historical.

Table V-17. Current Conditions for Tree Size Class on the Payette National Forest Wilderness, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	G/F/S/S Large	19.7 18.0	2.0 91.0	+17.7 -73.0	Out
PVG 2	G/F/S/S Large	28.5 17.3	3.0 80.0	+25.5 -62.7	Out
PVG 3	G/F/S/S Large	24.2 18.8	7.0 41.0	+17.2 -22.2	Out
PVG 4	G/F/S/S Large	16.5 12.8	4.0 34.0	+12.5 -21.0	Out
PVG 5	G/F/S/S Large	17.9 13.5	3.0 84.0	+14.9 -70.5	Out
PVG 6	G/F/S/S Large	20.7 22.4	7.0 56.0	+13.7 -33.6	Out
PVG 7	G/F/S/S Large	21.1 12.7	9.0 21.0	+12.1 -8.3	Out
PVG 8/9	G/F/S/S Large	28.2 17.4	7.0 21.0	+21.2 -3.6	Out
PVG 10	G/F/S/S *Medium Tree	13.0 29.0	14.0 20.0	-1.0 +9.0	**In**
PVG 11	G/F/S/S Large	14.8 8.3	11.0 27.0	+ 3.8 -18.7	Out

*PVG 10 refers to Medium Tree Size Class

<u>*Boise National Forest*</u> - Table V-18 represents the current condition on the Boise National Forest, as a percent of acres in each size class, and compares this to estimates of the mean of HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV. All of the PVGs, except PVG 10, have too many acres in the G/F/S/S size class, and too few acres in the large size class. PVG 10 does not produce large trees, so the G/F/S/S and medium tree size class were used. Medium size tree class was above the estimated historical. PVGs 8/9 are not found in large enough quantities on the Boise National Forest for analysis; acres are grouped with PVG 7.

Table V-18. Current Conditions for Tree Size Class on the Boise National Forest, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	G/F/S/S Large	26.5 12.3	2.0 91.0	+24.5 -78.7	Out
PVG 2	G/F/S/S Large	18.6 14.5	3.0 80.0	+15.6 -65.5	Out
PVG 3	G/F/S/S Large	29.9 13.5	7.0 41.0	+22.9 -27.4	Out
PVG 4	G/F/S/S Large	20.5 13.4	4.0 34.0	+16.5 -20.6	Out
PVG 5	G/F/S/S Large	17.9 18.1	3.0 84.0	+14.9 -65.9	Out
PVG 6	G/F/S/S Large	22.0 19.9	7.0 56.0	+15.0 -36.1	Out
PVG 7	G/F/S/S Large	24.6 7.7	9.0 21.0	+15.6 -13.3	Out
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 10	G/F/S/S *Medium Tree	12.5 31.3	14.0 20.0	- 1.5 +11.3	Out
PVG 11	G/F/S/S Large	11.3 5.7	11.0 27.0	+ 0.3 -21.3	Out

*PVG 10 refers to Medium Tree Size Class

<u>*Sawtooth National Forest*</u> - Table V-19 represents the current condition on the Sawtooth National Forest, for all areas outside of designated wilderness, as a percent of acres in each size class, and compares this to estimates of the mean of HRV to determine if current conditions are within the historical range. PVG 7 and 10 are within the HRV. None of the other PVGs are within the HRV. All of the PVGs, except for PVGs 7 and 10, have too many acres in the G/F/S/S size class, and too few acres in the large size class. In PVG 7, both size classes were slightly above historical. PVG 10 does not produce large trees, so the G/F/S/S and medium tree size class were used. Medium size tree class was slightly above the estimated historical. PVGs 5, 6, and 8/9 are not found in large enough quantities on the Sawtooth National Forest for analysis.

Table V-19. Current Conditions for Tree Size Class on the Sawtooth National Forest, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	G/F/S/S Large	26.7 12.8	2.0 91.0	+24.7 -78.2	Out
PVG 2	G/F/S/S Large	25.6 11.7	3.0 80.0	+22.6 -68.3	Out
PVG 3	G/F/S/S Large	23.4 14.4	7.0 41.0	+16.4 -26.6	Out
PVG 4	G/F/S/S Large	18.6 15.2	4.0 34.0	+14.6 -18.8	Out
PVG 5	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 6	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 7	G/F/S/S Large	14.3 21.6	9.0 21.0	+ 5.3 +0.6	**In**
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 10	G/F/S/S *Medium Tree	11.6 27.4	14.0 20.0	- 2.4 + 7.4	**In**
PVG 11	G/F/S/S Large	14.6 8.4	11.0 27.0	+ 3.6 -18.6	Out

*PVG 10 refers to Medium Tree Size Class

Table V-20 represents the current condition on the Sawtooth National Forest, for designated wilderness areas, as a percent of acres in each size class, and compares this to estimates of the mean of HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV, except for PVG 10. All of the PVGs, except PVG 10, have too many acres in the G/F/S/S size class, and too few acres in the large size class. PVG 10 does not produce large trees, so we examined the G/F/S/S and medium tree size class. Medium size tree class was slightly above historical.

Table V-20. Current Conditions for Tree Size Class on the Sawtooth National Forest Wilderness, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	G/F/S/S Large	43.9 4.1	2.0 91.0	+41.9 -86.9	Out
PVG 2	G/F/S/S Large	21.1 21.1	3.0 80.0	+18.1 -58.9	Out
PVG 3	G/F/S/S Large	20.5 19.5	7.0 41.0	+13.5 -21.5	Out
PVG 4	G/F/S/S Large	11.9 13.9	4.0 34.0	+ 7.9 -20.1	Out
PVG 5	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 6	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 7	G/F/S/S Large	24.4 5.2	9.0 21.0	+15.4 -15.8	Out
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A
PVG 10	G/F/S/S *Medium Tree	10.7 23.1	14.0 20.0	- 3.3 + 3.1	**In**
PVG 11	G/F/S/S Large	10.7 0.8	11.0 27.0	+ 0.3 -26.2	Out

*PVG 10 refers to Medium Tree Size Class

Canopy Closure Class - For each Forest, current canopy closure of the large tree size class by PVG was compared to the estimate of the mean of HRV, as described in Table V-9. The mean is used, rather than the entire range to make comparisons to the HRV, since the range is not appropriate for this purpose. Rare, extreme events define these bounds and spatial and temporal limits usually are not well defined in sufficiently explicit terms to make comparisons with the range (Landres et al. 1999). These values vary between PVGs. Each PVG is compared with the historical estimate of large tree canopy closure classes and the difference calculated. The current condition in this case is the proportion of acres of only the large trees that fall into each canopy closure class. Since the above analysis already shows that the large tree size class is below historical conditions, what is being examined here is the distribution of existing large trees between the three canopy closure classes. A mathematical comparison is applied to determine whether or not the current canopy closure classes deviate from the estimated distribution of historical. This was analyzed for the two canopy closure classes together within each PVG for which there is an historical estimate. The analysis assists with the determination of whether or not the range of canopy closure classes is within the historical range, or if it deviates from historical distribution.

<u>*Payette National Forest*</u> - Table V-21 represents the current condition on the Payette National Forest, outside of designated wilderness, as a percent of acres in each canopy closure class for large trees, and compares this to estimates of the HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV. PVGs 1, 2, 3, and 5 all have more acres in denser canopy closure classes than what was estimated to be historical. PVGs 4, 6, 7, 10, and 11 have more acres in both the high canopy closure class and the low canopy closure class, leaving a paucity of acres in the moderate canopy closure class. PVG 8/9 have slight deficits in the moderate and high classes, and an abundance of acres in the low canopy closure class.

Table V-21. Current Conditions for Large Tree Canopy Closure Class on the Payette National Forest, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	54.2 45.8 0	100 0 0	-54.2 +45.8 0	Out
PVG 2	Low Moderate High	42.9 34.7 22.4	85.0 15.0 0	-42.1 +19.7 +22.4	Out
PVG 3	Low Moderate High	0 43.5 56.5	15.0 85.0 0	-15.0 -41.5 +56.5	Out
PVG 4	Low Moderate High	10.3 51.9 37.8	3.0 97.0 0	+ 7.3 -45.1 +37.8	Out
PVG 5	Low Moderate High	25.9 47.3 26.8	35.0 65.0 0	- 9.1 - 9.1 +26.8	Out
PVG 6	Low Moderate High	18.4 37.0 44.6	0 100 0	+18.4 -63.0 +44.6	Out
PVG 7	Low Moderate High	16.6 63.9 19.5	3.0 97.0 0	+13.6 -33.1 +19.5	Out
PVG 8/9	Low Moderate High	8.3 55.0 36.7	0 60.0 40.0	+ 8.3 - 5.0 - 3.3	Out
*PVG 10	Low Moderate High	5.7 77.2 17.1	0 90.0 10.0	+ 5.7 -12.8 + 7.1	Out
PVG 11	Low Moderate High	30.4 50.5 19.1	7.0 93.0 0	+23.4 -42.5 +19.1	Out

*PVG 10 refers to Medium Tree Size Class

Table V-22 represents the current condition on the Payette National Forest, within designated wilderness, as a percent of acres in each canopy closure class for large trees, and compares this to estimates of the HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV. All PVGs have more acres in denser canopy closure classes than what was estimated to be historical. Several of the PVGs have more than historical in the low canopy closure class, but these numbers do not vary greatly from the historical estimates.

Table V-22. Current Conditions for Large Tree Canopy Closure Class on the Payette National Forest Wilderness, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	41.0 59.0 0	100 100 0	-59.0 -59.0 0	Out
PVG 2	Low Moderate High	15.6 47.3 37.1	85.0 15.0 0	-69.4 +32.3 +37.1	Out
PVG 3	Low Moderate High	3.6 53.9 42.4	15.0 85.0 0	-11.4 -11.4 +42.4	Out
PVG 4	Low Moderate High	3.6 67.9 28.5	3.0 3.0 0	+ 0.6 + 0.6 +28.5	Out
PVG 5	Low Moderate High	8.7 60.8 30.5	35.0 65.0 0	-26.3 - 4.2 +30.5	Out
PVG 6	Low Moderate High	4.1 44.6 51.4	0 100 0	+ 4.1 -55.4 +51.4	Out
PVG 7	Low Moderate High	3.1 38.6 58.2	3.0 97.0 0	+ 0.1 -58.4 +58.2	Out
PVG 8/9	Low Moderate High	1.3 27.6 71.1	0 60.0 40.0	+ 1.3 -32.4 +31.1	Out
*PVG 10	Low Moderate High	3.2 58.7 38.1	0 90.0 10.0	+ 3.2 -31.3 +28.1	Out
PVG 11	Low Moderate High	4.3 39.6 56.1	7.0 93.0 0	- 2.7 -53.4 +56.1	Out

*PVG 10 refers to Medium Tree Size Class

<u>Boise National Forest</u> **-** Table V-23 represents the current condition on the Boise National Forest as a percent of acres in each canopy closure class for large trees, and compares this to estimates of the HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV. All PVGs have more acres in denser canopy closure classes than what was estimated to be historical. Several of the PVGs have more than historical in the low canopy closure class, but generally the numbers do not vary greatly from the historical estimates. PVGs 5, 10, and 11 however, have larger amounts in the low canopy closure class.

Table V-23. Current Conditions for Large Tree Canopy Closure Class on the Boise National Forest, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	25.8 74.2 0	100 0 0	-74.2 +74.2 0	Out
PVG 2	Low Moderate High	19.7 53.8 26.5	85.0 15.0 0	-65.3 +38.8 +26.5	Out
PVG 3	Low Moderate High	10.3 58.8 30.9	15.0 85.0 0	- 4.7 -26.2 +30.9	Out
PVG 4	Low Moderate High	11.4 66.8 21.8	3.0 97.0 0	+ 8.4 -30.2 +21.8	Out
PVG 5	Low Moderate High	2.9 66.4 30.7	35.0 65.0 65.0	+32.1 - 1.4 +30.7	Out
PVG 6	Low Moderate High	1.7 60.3 37.9	0 100 0	+ 1.7 -39.7 +37.9	Out
PVG 7	Low Moderate High	10.1 68.3 21.6	3.0 97.0 0	+ 7.1 -28.7 +21.6	Out
PVG 8/9	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 10 (medium trees)	Low Moderate High	9.0 80.1 10.9	0 90.0 10.0	+ 9.0 - 9.9 + 0.9	Out
PVG 11	Low Moderate High	25.2 71.0 3.9	7.0 93.0 0	+18.2 -22.0 + 3.9	Out

*PVG 10 refers to Medium Tree Size Class

<u>Sawtooth National Forest</u> - Table V-24 represents the current condition on the Sawtooth National Forest, outside of designated wilderness, as a percent of acres in each canopy closure class for large trees, and compares this to estimates of the HRV to determine if current conditions are within the historical range. None of the PVGs, except PVG 10, are within the HRV. All PVGs have more acres in denser canopy closure classes than what was estimated to be historical, except for PVG 10. Several of the PVGs have more than historical in the low canopy closure class, but generally the numbers do not vary much from the historical estimates.

Table V-24. Current Conditions for Large Tree Canopy Closure Class on the Sawtooth National Forest, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	15.0 85.0 0	100 0 0	-85.0 +85.0 0	Out
PVG 2	Low Moderate High	15.2 44.5 40.3	85.0 15.0 0	-69.8 +29.5 +40.3	Out
PVG 3	Low Moderate High	8.8 70.7 20.5	15.0 85.0 0	- 6.2 -14.3 +20.5	Out
PVG 4	Low Moderate High	15.5 54.8 29.7	3.0 97.0 0	+12.5 -42.2 +29.7	Out
PVG 5	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 6	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 7	Low Moderate High	11.7 53.6 34.7	3.0 97.0 0	+ 8.7 -43.4 +34.7	Out
PVG 8/9	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
*PVG 10 (medium trees)	Low Moderate High	4.8 85.6 9.5	0 90.0 10.0	+ 4.8 - 4.4 - 0.5	**In**
PVG 11	Low Moderate High	11.2 68.6 20.2	7.0 93.0 0	+ 4.2 -24.4 +20.2	Out

*PVG 10 refers to Medium Tree Size Class

Table V-25 represents the current condition on the Sawtooth National Forest, within designated wilderness, as a percent of acres in each canopy closure class for large trees, and compares this to estimates of the HRV to determine if current conditions are within the historical range. None of the PVGs are within the HRV. All PVGs have more acres in denser canopy closure classes than what was estimated to be historical, except PVG 10. Several of the PVGs have more than historical in the low canopy closure class, but generally the numbers do not vary greatly from the historical estimates.

Table V-25. Current Conditions for Large Tree Canopy Closure Class on the Sawtooth National Forest Wilderness, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	16.6 83.4 0	100 0 0	-83.4 +83.4 0	Out
PVG 2	Low Moderate High	4.7 79.6 15.7	85.0 15.0 0	-80.3 +64.6 +15.7	Out
PVG 3	Low Moderate High	7.0 84.5 8.5	15.0 85.0 0	- 8.0 - 0.5 + 8.5	Out
PVG 4	Low Moderate High	7.8 77.3 14.8	3.0 97.0 0	+ 4.8 -19.7 +14.8	Out
PVG 5	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 6	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 7	Low Moderate High	9.9 74.8 15.4	3.0 97.0 0	+ 6.9 -22.2 +15.4	Out
PVG 8/9	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
*PVG 10 (medium trees)	Low Moderate High	14.6 79.3 6.1	0 90.0 10.0	+14.6 -10.7 - 3.9	Out
PVG 11	Low Moderate High	13.8 61.9 24.3	7.0 93.0 0	+ 6.9 -31.1 +24.3	Out

*PVG 10 refers to Medium Tree Size Class

Species Composition - In order to approximate the current condition for species composition, cover types from the LANDSAT data were overlain with the PVG layer. Cover types were then divided into individual species, based on knowledge of species distribution in the various PVG groups. These results were then compared mathematically to the HRV estimates to determine whether the current species composition is at, above, or below historical. These were determined for the entire Forest, and not broken into wilderness and non-wilderness, as this component was not modeled separately. PVGs were then placed in a seral status category, based upon the species composition. This was compared to the historical seral status. The deviations represent relative values to qualify this change. If a PVG historically consisted of seral species, but is currently composed of both seral and climax species (mixed), this represents a relative deviation of 1.0 from the historical condition. If a PVG historically was comprised of both seral and mixed species, but has lost the seral species in the current condition, a deviation of 0.5 captured this change. A similar scenario exists for those PVGs that historically were mixed, but are currently comprised of mixed and climax species. The largest relative changes are when a PVG was seral historically, and is currently climax species. This constitutes a deviation of 2.0 to display how much further these PVGS are from the HRV for species composition. This comparison does not apply to PVG 10, which generally expresses itself as a persistent seral.

Payette National Forest **-** Table V-26 displays the current condition for species composition on the Payette National Forest, as compared to estimates of the HRV to determine if current conditions are within the historical range. PVGs 4, 7, and 10 are within the HRV. None of the other PVGs are within the HRV. Generally, PVGs have higher percentages in climax species than would be estimated under historical conditions, and lower percentages in seral species than under historical conditions. In PVGs 6 and 8/9, western larch was at a very low percentage of those PVGs, though others species were within or close to historical range.

Table V-26. Current Conditions for Species Composition on the Payette National Forest, Compared with Historical Estimates, Expressed as a Percent of Acres in PVG
(Numbers in Parenthesis Represent Historical Estimates – Morgan and Parsons 2001)

Species	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
Aspen	**1** (*)	**2** (*)	**1** (1-11)	**8** (4-13)	**4** (*)	**3** (*)	**5** (6-11)	**4** (*)	**2** (*)	**3** (*)
Lodgepole pine	N/A	**<1** (*)	**9** (*)	**24** (10-20)	**3** (*)	**3** (1-5)	**44** (28-42)	**35** (25-37)	**79** (82-94)	**29** (18-25)
Ponderosa pine	**71** (96-99)	**53** (81-87)	**12** (26-41)	**2** (*)	**37** (80-88)	**32** (23-41)	**5** (*)	N/A	N/A	N/A
Western larch	N/A	N/A	N/A	N/A	**<1** (0-1)	**2** (15-29)	**<1** (*)	**1** (9-16)	N/A	N/A
Whitebark pine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**2** (*)	**13** (32-47)
Douglas-fir	**28** (0-2)	**45** (10-16)	**78** (47-69)	**66** (66-81)	**38** (7-17)	**34** (15-25)	**26** (24-34)	**6** (23-37)	**3** (*)	N/A
Englemann spruce	N/A	N/A	N/A	N/A	**<1** (*)	**1** (0-2)	**<1** (3-5)	**27** (10-33)	**1** (*)	**9** (8-13)

Species	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
Grand fir	N/A	N/A	N/A	N/A	**18** (0-1)	**24** (9-23)	**<1** (*)	N/A	N/A	N/A
Subalpine fir	N/A	N/A	N/A	N/A	N/A	**1** (0-3)	**19** (12-21)	**27** (11-33)	**13** (*)	**46** (18-29)
Within Historical	Out	Out	Out	**In**	Out	Out	**In**	Out	**In**	Out

*These species were not explicitly modeled during the development of the Historical Ranges of Variability.

When considering seral stages, as displayed in Table V-27, PVG 11 is the furthest from historical, followed by PVG 2 and PVG 5. PVGs 1, 3, 6, and 8/9 vary slightly and PVGs 4 and 7 are within historical.

Table V-27. Payette National Forest Current Deviation from Historical Seral Status by PVG

Seral Status	Potential Vegetation Group									
	1	2	3	4	5	6	7	8/9	10	11
Historical	seral	seral	mixed	mixed	seral-mixed	mixed	seral-mixed	climax	N/A	seral-mixed
Current	seral-mixed	mixed	mixed-climax	mixed	mixed-climax	mixed-climax	seral-mixed	mixed-climax		climax
Deviation	0.5	1.0	0.5	0.0	1.0	0.5	0.0	0.5		1.5

<u>*Boise National Forest*</u> – Table V-28 displays the current condition for species composition on the Boise National Forest, as compared to estimates of the HRV to determine if current conditions are within the historical range. PVGs 3, 4, 7, and 10 are within the HRV. None of the other PVGs are within the HRV. Generally, PVGs have higher percentages in climax species than would be estimated under historical conditions, and lower percentages in seral species than under historical conditions. In PVGs 6 and 8/9, western larch was at a very low percentage of those PVGs, though others species were within or close to historical range.

Table V-28. Current Conditions for Species Composition on the Boise National Forest, Compared with Historical Estimates, Expressed as a Percent of Acres in PVG
(Numbers in Parenthesis Represent Historical Estimates – Morgan and Parsons 2001)

Species	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
Aspen	**2** (*)	**1** (*)	**6** (1-11)	**10** (4-13)	**1** (*)	**7** (*)	**5** (6-11)	N/A	**5** (*)	**2** (*)
Lodgepole pine	N/A	**<1** (*)	**6** (*)	**20** (10-20)	**1** (*)	**5** (1-5)	**32** (28-42)	N/A	**68** (82-94)	**18** (18-25)
Ponderosa pine	**39** (96-99)	**66** (81-87)	**19** (26-41)	**6** (*)	**55** (80-88)	**29** (23-41)	**3** (*)	N/A	N/A	N/A
Western larch	N/A	N/A	N/A	N/A	**<1** (0-1)	**2** (15-29)	**<1** (*)	N/A	N/A	N/A
Whitebark pine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**2** (*)	**14** (32-47)
Douglas-fir	**59** (0-2)	**33** (10-16)	**69** (47-69)	**64** (66-81)	**32** (7-17)	**33** (15-25)	**34** (24-34)	N/A	**7** (*)	N/A
Englemann spruce	N/A	N/A	N/A	N/A	**<1** (*)	**1** (0-2)	**<1** (3-5)	N/A	**2** (*)	**12** (8-13)
Grand fir	N/A	N/A	N/A	N/A	**11** (0-1)	**22** (9-23)	**<1** (*)	N/A	N/A	N/A
Subalpine fir	N/A	N/A	N/A	N/A	N/A	**1** (0-3)	**24** (12-21)	N/A	**16** (*)	**54** (18-29)
Within Historical	Out	Out	**In**	**In**	Out	Out	**In**	N/A	**In**	Out

*These species were not explicitly modeled during the development of the Historical Ranges of Variability.

When considering seral stages, as displayed in Table V-29, PVG 11 is the furthest from historical, followed by PVG 1 and PVG 2. PVGs 5 and 6 vary slightly and PVGs 3, 4 and 7 are within historical.

Table V-29. Boise National Forest Current Deviation from Historical Seral Status by PVG

Seral Status	Potential Vegetation Group									
	1	2	3	4	5	6	7	8/9[1]	10	11
Historical	seral	seral	mixed	mixed	seral-mixed	mixed	seral-mixed		N/A	seral-mixed
Current	mixed	mixed	mixed	mixed	mixed	mixed-climax	seral-mixed			climax
Deviation	1.0	1.0	0.0	0.0	0.5	0.5	0.0			1.5

[1]Acres in these PVGs were very small and added together with PVG7.

<u>Sawtooth National Forest</u> - Table V-30 displays the current condition for species composition on the Sawtooth National Forest, as compared to estimates of the HRV to determine if current conditions are within the historical range. PVGs 4 and 10 are within the HRV. None of the other PVGs are within the HRV. Generally, PVGs have higher percentages in climax species than would be estimated under historical conditions, and lower percentages in seral species than under historical conditions.

Table V-30. Current Conditions for Species Composition on the Sawtooth National Forest, Compared with Historical Estimates, Expressed as a Percent of Acres in PVG

(Numbers in Parenthesis Represent Historical Estimates – Morgan and Parsons 2001)

Species	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
Aspen	**5** (*)	**1** (*)	**4** (1-11)	**7** (4-13)	N/A	N/A	**3** (6-11)	N/A	**4** (*)	**1** (*)
Lodgepole pine	N/A	**<1** (*)	**6** (*)	**15** (10-20)	N/A	N/A	**12** (28-42)	N/A	**82** (82-94)	**2** (18-25)
Ponderosa pine	**10** (96-99)	**59** (81-87)	**3** (26-41)	**<1** (*)	N/A	N/A	**<1** (*)	N/A	N/A	N/A
Western larch	N/A	N/A	N/A	N/A	N/A	N/A	**1** (*)	N/A	N/A	N/A
Whitebark pine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**2** (*)	**40** (32-47)
Douglas-fir	**85** (0-2)	**40** (10-16)	**87** (47-69)	**77** (66-81)	N/A	N/A	**52** (24-34)	N/A	**3** (*)	N/A
Englemann spruce	N/A	N/A	N/A	N/A	N/A	N/A	**1** (3-5)	N/A	**<1** (*)	**8** (8-13)
Grand fir	N/A	N/A	N/A	N/A	N/A	N/A	**0** (*)	N/A	N/A	N/A
Subalpine fir	N/A	N/A	N/A	N/A	N/A	N/A	**30** (12-21)	N/A	**9** (*)	**49** (18-29)
Within Historical	Out	Out	Out	**In**	N/A	N/A	Out	N/A	**In**	Out

*These species were not explicitly modeled during the development of the Historical Ranges of Variability.

When considering seral stages, as displayed in Table V-31, PVG 1 is the furthest from historical, followed by PVG 2, 7, and 11. PVG 4 is within historical.

Table V-31. Sawtooth National Forest Current Deviation from Historical Seral Status by PVG

Seral Status	Potential Vegetation Group									
	1	2	3	4	5[1]	6[1]	7	8/9[1]	10	11
Historical	seral	seral	mixed	mixed			seral-mixed		N/A	seral-mixed
Current	climax	mixed	climax	mixed			mixed-climax			mixed-climax
Deviation	2.0	1.0	1.0	0.0			1.0			1.0

[1]PVGs 5, 6, and 8/9 were not mapped on the Sawtooth as they did not occur or are of insignificant size.

Comparison of Current Condition with Desired Conditions by Alternative

Each alternative has a different desired condition. Therefore, current condition is evaluated as to whether or it meets the desired condition for each alternative, and if not, how far away it is from meeting that condition. However, this still does not give us a good basis for comparing the alternatives to each other, since each alternative has a different desired condition. That is why current condition is also compared to the HRV as a better measure of whether an alternative meets the needs for ecological processes and functions and how the alternatives compare to each other.

Size Class - The current condition for size classes is compared with the DC for each alternative, to determine how far away the current condition is from a DC for a particular alternative. A mathematical comparison is applied to determine whether or not the current size classes deviate from the distribution of the DC. This was analyzed for two size classes together, the G/F/S/S and the large tree, as these are the two components for which desired conditions are modeled. This analysis assists with the determination of whether or not the range of size classes is within the desired range, or if they deviate from the desired distribution.

Payette National Forest - Table V-32 represents the amount of variation from the desired conditions for current condition acres outside of designated wilderness. Table V-33 displays the results of analysis and whether conditions meet the desired conditions. The current conditions for tree size class do not meet the desired conditions for any alternative. All PVGs in Alternatives 1B, 2, 3, 4, 6, and 7 that are outside of designated wilderness, with the exception of PVG 10, have too many acres in the G/F/S/S class and not enough acres in the large size class. PVG 10 varies by alternative as to whether the acres are above or below the DC; no trend is evident as it is in the other PVGs. PVGs 1, 2, 5, 7, 8/9 and 11 in Alternative 5 still display too many acres in the G/F/S/S class and too little in the large tree size class. However, PVGs 3, 4, and 6 display too many acres in both these classes relative to the DC, indicating the intermediate size classes are low to meet the DC for this alternative. Alternative 5 has lower values for large trees in the DC, compared to other alternatives, thus facilitating some of the PVGs being above the DC rather than below, as it is in other alternatives.

Table V-32. Current Conditions for Tree Size Class on the Payette National Forest (Outside of Designated Wilderness), Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1	G/F/S/S	19.3	+17.3	+17.3	+17.3	+18.3	+17.3	+18.3	+13.3
	Large	16.4	-30.6	-52.6	-74.6	-74.6	- 7.6	-64.6	-54.6
2	G/F/S/S	28.1	+22.1	+25.1	+25.1	+26.1	+20.1	+26.1	+21.1
	Large	18.8	-40.2	-51.2	-61.2	-61.2	-11.2	-57.2	-38.2
3	G/F/S/S	22.8	+11.8	+12.8	+15.8	+18.8	+10.8	+17.8	+14.8
	Large	21.7	- 1.3	-10.3	-19.3	-19.3	+ 1.7	-30.3	-29.3
4	G/F/S/S	29.4	+24.4	+24.4	+25.4	+26.4	+23.4	+26.4	+15.4
	Large	14.8	- 5.2	-12.2	-19.2	-19.2	+ 5.2	-18.2	-18.2
5	G/F/S/S	22.5	+15.5	+19.5	+19.5	+19.5	+12.5	+19.5	+17.5
	Large	23.5	-42.5	-51.5	-60.5	-60.5	- 9.5	-56.5	-38.5
6	G/F/S/S	20.0	+ 9.0	+11.0	+13.0	+16.0	+ 8.0	+15.0	+12.0
	Large	25.0	- 3.0	-17.0	-31.0	-31.0	+ 5.0	-25.0	-14.0
7	G/F/S/S	26.7	+15.7	+14.7	+17.7	+21.7	+16.7	+19.7	+11.7
	Large	10.9	- 0.9	- 9.1	-10.1	-10.1	- 9.1	- 9.1	- 9.1
8/9	G/F/S/S	28.9	+17.9	+20.9	+21.9	+23.9	+14.9	+22.9	+11.9
	Large	10.6	- 7.4	- 9.4	-10.4	-10.4	- 9.4	-10.4	-10.4

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
10	G/F/S/S *Medium	13.8 36.7	- 1.2 -25.7	- 7.2 +16.7	- 0.2 -16.7	+ 7.8 +16.7	+ 3.8 +25.7	+ 3.8 +16.7	- 8.2 +16.7
11	G/F/S/S Large	31.7 4.4	+15.7 - 9.6	+15.7 -16.6	+20.7 -22.6	+26.7 -22.6	+15.7 -15.6	+23.7 -21.6	+16.7 -21.6

*PVG 10 refers to Medium Tree Size Class

Table V-33. Comparison Results for Tree Size Class on the Payette National Forest (Outside of Designated Wilderness), Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	G/F/S/S Large	19.3 16.4	Out	Out	Out	Out	Out	Out	Out
2	G/F/S/S Large	28.1 18.8	Out	Out	Out	Out	Out	Out	Out
3	G/F/S/S Large	22.8 21.7	Out	Out	Out	Out	Out	Out	Out
4	G/F/S/S Large	29.4 14.8	Out	Out	Out	Out	Out	Out	Out
5	G/F/S/S Large	22.5 23.5	Out	Out	Out	Out	Out	Out	Out
6	G/F/S/S Large	20.0 25.0	Out	Out	Out	Out	Out	Out	Out
7	G/F/S/S Large	26.7 10.9	Out	Out	Out	Out	Out	Out	Out
8/9	G/F/S/S Large	28.9 10.6	Out	Out	Out	Out	Out	Out	Out
10	G/F/S/S Large	13.8 36.7	Out	Out	Out	Out	Out	Out	Out
11	G/F/S/S Large	31.7 4.4	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

For areas within designated wilderness, the mean of HRV is the desired condition, therefore the comparison with the DC would be the same as the comparison with HRV discussed above under Comparison of Current Condition with Historical Estimates.

<u>*Boise National Forest*</u> - Table V-34 represents the amount of variation from the desired conditions for current conditions. Table V-35 displays the results of analysis. The current conditions for tree size class do not meet the desired conditions for any alternative. For all PVGs in any alternative, with the exception of PVGs 10 and 11, there are too many acres in the G/F/S/S class and not enough acres in the large size class. PVG 10 varies by alternative as to whether the G/F/S/S acres are above or below the DC, but all acres in the medium tree size class are above the DC. PVG 11 also varies by alternative as to whether the G/F/S/S acres are above or below the DC; the large tree size class is always below the DC.

Table V-34. Current Conditions for Tree Size Class on the Boise National Forest Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	G/F/S/S Large	26.5 12.3	+24.5 -34.7	+24.5 -56.7	+24.5 -78.7	+25.5 -78.7	+24.5 -11.7	+25.5 -68.7	+20.5 -56.7
PVG 2	G/F/S/S Large	18.6 14.5	+12.6 -44.5	+15.6 -55.5	+15.6 -65.5	+16.6 -65.5	+10.6 -15.5	+16.6 -61.5	+11.6 -37.5
PVG 3	G/F/S/S Large	29.9 13.6	+18.9 - 9.4	+19.9 -18.4	+22.9 -27.4	+25.9 -27.4	+17.9 - 6.4	+24.9 -27.4	+20.9 -17.4
PVG 4	G/F/S/S Large	20.5 13.4	+15.5 - 6.5	+16.5 -13.6	+16.5 -20.6	+17.5 -20.6	+14.5 - 6.6	+17.5 -16.6	+ 6.5 -15.6
PVG 5	G/F/S/S Large	17.9 18.1	+10.9 -47.9	+14.9 -56.9	+14.9 -65.9	+14.9 -65.9	+ 7.9 -14.9	+14.9 -57.9	+11.9 -32.9
PVG 6	G/F/S/S Large	22.0 19.9	+11.0 - 8.1	+13.0 -22.1	+15.0 -36.1	+18.0 -36.1	+10.0 - 0.1	+17.0 -26.1	+13.0 -13.1
PVG 7	G/F/S/S Large	24.6 7.7	+13.6 - 2.3	+12.6 -12.3	+15.6 -13.3	+19.6 -13.3	+14.6 -12.3	+17.6 -12.3	+ 9.6 -12.3
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
PVG 10	G/F/S/S *Medium	10.1 32.2	- 4.9 +21.2	-10.9 +12.2	- 3.9 +12.2	+ 4.1 +12.2	+ 0.1 +12.2	+ 0.1 +12.2	-11.9 +12.2
PVG 11	G/F/S/S Large	11.3 5.7	- 4.7 - 8.3	- 4.7 -15.3	+ 0.3 -21.3	+ 6.3 -21.3	- 4.7 -14.3	+ 3.3 -21.3	- 2.7 -21.3

*PVG 10 refers to Medium Tree Size Class

Table V-35. Comparison Results for Tree Size Class on the Boise National Forest Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	G/F/S/S Large	26.5 12.3	Out	Out	Out	Out	Out	Out	Out
2	G/F/S/S Large	18.6 14.5	Out	Out	Out	Out	Out	Out	Out
3	G/F/S/S Large	29.9 13.6	Out	Out	Out	Out	Out	Out	Out
4	G/F/S/S Large	20.5 13.4	Out	Out	Out	Out	Out	Out	Out
5	G/F/S/S Large	17.9 18.1	Out	Out	Out	Out	Out	Out	Out
6	G/F/S/S Large	22.0 19.9	Out	Out	Out	Out	Out	Out	Out
7	G/F/S/S Large	24.6 7.7	Out	Out	Out	Out	Out	Out	Out

PVG	Size Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	G/F/S/S Large	10.1 32.2	Out	Out	Out	Out	Out	Out	Out
11	G/F/S/S Large	11.3 5.7	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

Sawtooth National Forest - Table V-36 represents the amount of variation from the desired conditions for current condition acres outside of designated wilderness. Table V-37 displays the results of analysis. The current conditions for tree size class meet the desired conditions for PVG 7 in Alternatives 2, 3, 5, and 7; PVG 10 in Alternatives 3, 5, 6, and 7; and PVG 11 in Alternative 1B. PVG 11 varies in the other alternatives as to whether the G/F/S/S acres are above or below the DC; the large tree size class is always below the DC. PVG 7 in the alternatives where it does not meet the DC always has too many acres in both the G/F/S/S and large tree size class. PVG 10 in the alternatives where it does not meet the DC varies as to whether the G/F/S/S acres are above or below the DC; the medium tree size class is always above the DC. For the other PVGs that do not meet the DC in any of the alternatives, there are too many acres in the G/F/S/S class and not enough acres in the large size class.

Table V-36. Current Conditions for Tree Size Class on the Sawtooth National Forest (Outside of Designated Wilderness) Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	G/F/S/S Large	26.7 12.8	+24.7 -34.2	+24.7 -56.2	+24.7 -78.2	+25.7 -78.2	+24.7 -11.2	+25.7 -68.2	+24.7 -75.2
PVG 2	G/F/S/S Large	25.6 11.7	+19.6 -47.3	+22.6 -58.3	+22.6 -68.3	+23.6 -68.3	+17.6 -18.3	+23.6 -71.3	+19.6 -57.3
PVG 3	G/F/S/S Large	23.4 14.4	+12.4 -8.6	+13.4 -16.6	+16.4 -26.6	+19.4 -26.6	+11.4 - 5.6	+18.4 -33.6	+15.4 -29.6
PVG 4	G/F/S/S Large	18.6 15.2	+13.6 - 4.8	+14.6 -11.8	+14.6 -18.8	+15.6 -18.8	+12.6 - 4.8	+15.6 -15.8	+ 4.6 -15.8
PVG 5	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
PVG 6	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 7	G/F/S/S Large	14.3 21.6	+ 3.3 +11.6	+ 2.3 + 1.6	+ 5.3 + 0.6	+ 9.3 + 0.6	+ 4.3 + 1.6	+ 7.3 + 1.6	- 0.7 + 1.6
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
PVG 10	G/F/S/S *Medium	11.6 27.4	- 3.4 +16.4	- 9.4 + 7.4	- 2.4 + 7.4	+ 5.6 + 7.4	+ 1.6 + 7.4	+ 1.6 + 7.4	- 9.4 + 7.4
PVG 11	G/F/S/S Large	14.6 8.4	-1.4 -5.6	-1.4 -12.6	+3.6 -18.6	+9.6 -18.6	-1.4 -11.6	+6.6 -17.6	-0.4 -17.6

*PVG 10 refers to Medium Tree Size Class

Table V-37. Comparison Results for Tree Size Class on the Sawtooth National Forest (Outside of Designated Wilderness) Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	G/F/S/S Large	26.7 12.8	Out	Out	Out	Out	Out	Out	Out
2	G/F/S/S Large	25.6 11.7	Out	Out	Out	Out	Out	Out	Out
3	G/F/S/S Large	23.4 14.4	Out	Out	Out	Out	Out	Out	Out
4	G/F/S/S Large	18.6 15.2	Out	Out	Out	Out	Out	Out	Out
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	G/F/S/S Large	14.3 21.6	Out	**In**	**In**	Out	**In**	Out	**In**
8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	G/F/S/S Large	11.6 27.4	Out	Out	**In**	Out	**In**	**In**	**In**
11	G/F/S/S Large	14.6 8.4	**In**	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

For areas within designated wilderness, the mean of HRV is the desired condition, therefore, the comparison with the DC would be the same as the comparison with HRV discussed above under Comparison of Current Condition with Historical Estimates.

Canopy Closure - The current condition for canopy closure classes is compared with the DCs for each alternative, to determine how far away the current condition is from a DC for a particular alternative. A mathematical comparison is applied to determine whether or not the current canopy closure classes deviate from the distribution of the DC. This was analyzed for the canopy closure classes together. The analysis assists with the determination of whether or not the canopy closure classes are within the desired range, or if they deviate from the desired condition. Unlike the comparison to the historical condition, where we only looked at the proportion of large trees relative to canopy closure HRV, here the acreages in the large tree low, moderate, and high canopy closure classes are compared directly with the DC acreages. If the large tree size class overall is below or above the DC, this will also affect the canopy closure of large trees. Comparison of the DCs in this way facilitates the forthcoming analysis of how well the alternatives reach their respective DCs with predictive modeling.

Payette National Forest - Table V-38 shows the amount of variation from the DCs for current conditions in areas outside of designated wilderness. Table V-39 displays the results of the analysis. The current conditions for large tree canopy closure class meet the desired conditions for PVG 7 in Alternative 1B. No other PVGs meet the DCs for any other alternative. In general, most PVGs display an abundance of acres in denser canopy closure classes than what would be desired for a given alternative, and a paucity of acres in the less dense canopy closure classes. PVG 8/9 varies in that there are too many acres in the low canopy closure class. PVG 10 is generally above the DC for all canopy closures in the medium trees, except for Alternatives 2 and 7, which are slightly below the DC for the high canopy closure class. PVGs 4 and 6 do not lack acres in the low canopy closure class in any alternative. PVG 7 displays this condition in Alternatives 2, 3, 4, and 6.

Table V-38. Current Conditions for Canopy Closure Class on the Payette National Forest (Outside of Designated Wilderness), Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size/Canopy Closure Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt 5	Alt. 6	Alt. 7
1	Large Low	8.9	-38.1	-60.1	-82.1	-82.1	-15.1	-72.1	-62.1
	Large Mod.	7.5	+ 7.5	+7.5	+7.5	+7.5	+7.5	+7.5	+7.5
	Large High	0	0	0	0	0	0	0	0
2	Large Low	8.1	+ 0.1	-51.9	-59.9	-59.9	+ 4.1	-56.9	-17.9
	Large Mod.	6.5	-44.5	- 4.5	- 5.5	- 5.5	-19.5	- 4.5	-24.5
	Large High	4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2
3	Large Low	0	0	- 5.0	- 6.0	- 6.0	0	- 8.0	- 7.0
	Large Mod.	9.5	-13.5	-17.5	-25.5	-25.5	-10.5	-34.5	-34.5
	Large High	12.2	+12.2	+12.2	+12.2	+12.2	+12.2	+12.2	+12.2
4	Large Low	1.5	+ 1.5	+ 0.5	+ 0.5	+ 0.5	+ 1.5	+ 0.5	+ 0.5
	Large Mod.	7.7	-12.3	-18.3	-25.3	-25.3	-12.3	-24.3	-24.3
	Large High	5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6
5	Large Low	6.1	- 2.9	-19.9	-22.9	-22.9	+ 2.1	-21.9	-8.9
	Large Mod.	11.1	-45.9	-37.9	-43.9	-43.9	-17.9	-40.9	-35.9
	Large High	6.3	+ 6.3	+ 6.3	+ 6.3	+ 6.3	+ 6.3	+ 6.3	+ 6.3
6	Large Low	4.6	+ 4.6	+ 4.6	+ 4.6	+ 4.6	+ 4.6	+ 4.6	+ 4.6
	Large Mod.	9.3	-18.7	-32.7	-46.7	-46.7	-10.7	-40.7	-29.7
	Large High	11.1	+11.1	+11.1	+11.1	+11.1	+11.1	+11.1	+11.1
7	Large Low	1.8	- 1.2	+ 0.8	+ 0.8	+ 0.8	- 5.2	+ 0.8	- 0.2
	Large Mod.	7.0	0	-12.0	-13.0	-13.0	- 6.0	-12.0	-11.0
	Large High	2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1

PVG	Size/Canopy Closure Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt 5	Alt. 6	Alt. 7
8/9	Large Low Large Mod. Large High	0.9 5.8 3.9	+ 0.9 - 1.2 - 7.1	+ 0.9 - 6.2 - 4.1	+ 0.9 - 7.2 - 4.1	+ 0.9 - 7.2 - 4.1	+ 0.9 - 2.2 - 8.1	+ 0.9 - 7.2 - 4.1	+ 0.9 - 6.2 - 5.1
10*	Medium Low Medium Mod. Medium High	2.1 28.3 6.3	+ 2.1 +23.3 + 0.3	+ 2.1 +16.3 - 1.7	+ 2.1 +10.3 + 4.3	+ 2.1 +10.3 + 4.3	+ 2.1 +23.3 + 0.3	+ 2.1 +10.3 + 4.3	+ 2.1 +12.3 - 2.7
11	Large Low Large Mod. Large High	1.3 2.2 0.8	- 7.7 - 2.8 + 0.8	+ 0.3 -17.8 + 0.8	- 0.7 -22.8 + 0.8	- 0.7 -22.8 + 0.8	-11.7 - 4.8 + 0.8	- 0.7 -21.8 + 0.8	- 1.7 -20.8 + 0.8

*PVG 10 refers to Medium Tree Size Class

Table V-39. Comparison Results for Canopy Closure Class on the Payette National Forest (Outside of Designated Wilderness), Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size/Canopy Closure Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	Large Low Large Mod. Large High	8.9 7.5 0	Out	Out	Out	Out	Out	Out	Out
2	Large Low Large Mod. Large High	8.1 6.5 4.2	Out	Out	Out	Out	Out	Out	Out
3	Large Low Large Mod. Large High	0 9.5 12.2	Out	Out	Out	Out	Out	Out	Out
4	Large Low Large Mod. Large High	1.5 7.7 5.6	Out	Out	Out	Out	Out	Out	Out
5	Large Low Large Mod. Large High	6.1 11.1 6.3	Out	Out	Out	Out	Out	Out	Out
6	Large Low Large Mod. Large High	4.6 9.3 11.1	Out	Out	Out	Out	Out	Out	Out
7	Large Low Large Mod. Large High	1.8 7.0 2.1	In	Out	Out	Out	Out	Out	Out
8/9	Large Low Large Mod. Large High	0.9 5.8 3.9	Out	Out	Out	Out	Out	Out	Out
10*	Medium Low Medium Mod. Medium High	2.1 28.3 6.3	Out	Out	Out	Out	Out	Out	Out
11	Large Low Large Mod. Large High	1.3 2.2 0.8	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

Table V-40 shows the amount of variation from the DC in areas inside of designated wilderness, and displays the results of the analysis. The current conditions for large tree canopy closure class do not meet the desired conditions for any PVG. In general, most PVGs display an abundance of acres in denser canopy closure classes than what would be desired for designated wilderness, and a paucity of acres in the less dense canopy closure classes. PVGs 6, 8/9, and 10 vary in that they are not lacking acres in the low canopy closure class.

Table V-40. Current Conditions for Canopy Closure Class on the Payette National Forest (Inside of Designated Wilderness), Compared with Desired Conditions, Expressed as a Percent of Total Acreage

PVG	Size/Canopy Closure Classes	Current	Difference from Desired Condition	Within Desired Conditions
1	Large Low	7.4	-83.6	Out
	Large Moderate	10.6	+10.6	
	Large High	0	0	
2	Large Low	2.7	-65.3	Out
	Large Moderate	8.2	- 3.8	
	Large High	6.4	+ 6.4	
3	Large Low	0.7	- 5.3	Out
	Large Moderate	10.1	-24.9	
	Large High	8.0	+ 8.0	
4	Large Low	0.5	- 0.5	Out
	Large Moderate	8.7	-24.3	
	Large High	3.7	+ 3.7	
5	Large Low	1.2	-27.8	Out
	Large Moderate	8.2	-46.8	
	Large High	4.1	+ 4.1	
6	Large Low	0.9	+ 0.9	Out
	Large Moderate	10.0	-46.0	
	Large High	11.5	+11.5	
7	Large Low	0.4	- 0.6	Out
	Large Moderate	4.9	-15.1	
	Large High	7.3	+ 7.3	
8/9	Large Low	0.2	+ 0.2	Out
	Large Moderate	4.8	- 8.2	
	Large High	12.3	+ 4.3	
10*	Medium Low	0.9	+ 0.9	Out
	Medium Moderate	17.0	- 1.0	
	Medium High	11.1	+ 9.1	
11	Large Low	0.4	- 1.6	Out
	Large Moderate	3.3	-21.7	
	ge High	4.7	+ 4.7	

*PVG 10 refers to Medium Tree Size Class

<u>Boise National Forest</u> - Table V-41 shows the amount of variation from the DCs for current conditions. Table V-42 displays the results of the analysis. The current conditions for large tree canopy closure class meet the desired conditions for PVG 6 in Alternative 5, PVG 7 in Alternative 1B, and PVG 10 in Alternatives 2, 3, 4, and 6. No other PVGs meet the DCs for any other alternative. In general, most PVGs not meeting the DCs display an abundance of acres in

denser canopy closure classes than what would be desired for a given alternative, and a paucity of acres in the less dense canopy closure classes. PVGs 3, 6, and 10 in Alternatives 1B and 5, and PVG 11 in Alternative 2 do not lack acres in the low canopy closure class. PVG 10 is generally above the DC for all canopy closures in the medium trees, except for Alternatives 1B, 5, and 7, which are slightly below the DC for the high canopy closure class.

Table V-41. Current Conditions for Canopy Closure Class on the Boise National Forest Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size/Canopy Closure Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1	Large Low	3.2	-43.8	-65.8	-87.8	-87.8	-20.8	-77.8	-65.8
	Large Mod.	9.1	+ 9.1	+ 9.1	+ 9.1	+ 9.1	+ 9.1	+ 9.1	+ 9.1
	Large High	0	0	0	0	0	0	0	0
2	Large Low	2.9	- 5.1	-57.1	-65.1	-65.1	- 1.1	-62.1	-18.1
	Large Mod.	7.8	-43.2	- 3.2	- 4.2	- 4.2	-18.2	- 3.2	-23.2
	Large High	3.9	+ 3.9	+ 3.9	+3.9	+3.9	+ 3.9	+ 3.9	+ 3.9
3	Large Low	1.4	+ 1.4	- 3.6	- 4.6	- 4.6	+ 1.4	- 4.6	- 0.6
	Large Mod.	8.0	-15.0	-19.0	-27.0	-27.0	-12.0	-27.0	-21.0
	Large High	4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2	+ 4.2
4	Large Low	1.5	+ 1.5	+ 0.5	+ 0.5	+ 0.5	+ 1.5	+ 0.5	+ 0.5
	Large Mod.	8.9	-11.1	-17.1	-24.1	-24.1	-11.1	-20.1	-19.1
	Large High	2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9
5	Large Low	0.5	- 8.5	-25.5	-28.5	-28.5	- 3.5	-26.5	- 9.5
	Large Mod.	12.0	-45.0	-37.0	-43.0	-43.0	-17.0	-37.0	-29.0
	Large High	5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6	+ 5.6
6	Large Low	0.3	+ 0.3	+ 0.3	+ 0.3	+ 0.3	+ 0.3	+ 0.3	+ 0.3
	Large Mod.	12.0	-16.0	-30.0	-44.0	-44.0	- 8.0	-34.0	-21.0
	Large High	7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5
7	Large Low	0.8	- 2.2	- 0.2	- 0.2	- 0.2	- 6.2	- 0.2	- 0.2
	Large Mod.	5.2	-1.8	-13.8	-14.8	-14.8	-7.8	-13.8	-13.8
	Large High	1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7
8/9	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Mod.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Medium Low	2.8	+ 2.8	+ 2.8	+ 2.8	+ 2.8	+ 2.8	+ 2.8	+ 2.8
	Medium Mod.	25.1	+20.1	+ 7.1	+ 7.1	+ 7.1	+16.1	+ 7.1	+ 9.1
	Medium High	3.4	- 2.6	+ 1.4	+ 1.4	+ 1.4	- 7.6	+ 1.4	- 0.6
11	Large Low	1.4	- 7.6	+ 0.4	- 0.6	- 0.6	-11.6	- 0.6	-22.6
	Large Mod.	4.1	- 0.9	-15.9	-20.9	-20.9	- 2.9	-20.9	-20.9
	Large High	0.2	+ 0.2	+ 0.2	+ 0.2	+ 0.2	+ 0.2	+ 0.2	+ 0.2

*PVG 10 refers to Medium Tree Size Class

Table V-42. Comparison Results for Canopy Closure Class on the Boise National Forest, Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size/Canopy Closure Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	Large Low Large Mod. Large High	3.2 9.1 0	Out	Out	Out	Out	Out	Out	Out
2	Large Low Large Mod. Large High	2.9 7.8 3.9	Out	Out	Out	Out	Out	Out	Out
3	Large Low Large Mod. Large High	1.4 8.0 4.2	Out	Out	Out	Out	Out	Out	Out
4	Large Low Large Mod. Large High	1.5 8.9 2.9	Out	Out	Out	Out	Out	Out	Out
5	Large Low Large Mod. Large High	0.5 12.0 5.6	Out	Out	Out	Out	Out	Out	Out
6	Large Low Large Mod. Large High	0.3 12.0 7.5	Out	Out	Out	Out	**In**	Out	Out
7	Large Low Large Mod. Large High	0.8 5.2 1.7	In	Out	Out	Out	Out	Out	Out
8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*	Medium Low Medium Mod. Medium High	2.8 25.1 3.4	Out	**In**	**In**	**In**	Out	**In**	Out
11	Large Low Large Mod. Large High	1.4 4.1 0.2	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

<u>Sawtooth National Forest</u> - Table V-43 shows the amount of variation from the DCs for current conditions for the Sawtooth National Forest in areas outside of designated wilderness. Table V-44 displays the results of the analysis. The current conditions for large tree canopy closure class meet the desired conditions for PVG 10 in Alternatives 2, 3, 4, and 6. No other PVGs meet the DCs for any other alternative. In general, most PVGs not meeting the DCs display an abundance of acres in denser canopy closure classes than what would be desired for a given alternative, and a paucity of acres in the less dense canopy closure classes. Exceptions to this are PVG 4 in all alternatives, PVG 3 in Alternatives 1B and 5, and PVG 7 in Alternatives 2, 3, 4, 6, and 7, which do not display a lack of acres in the low canopy closure class. PVG 10 is generally above the DC for all canopy closures in the medium trees, except for Alternatives 1B, 5, and 7, which are slightly below the DC for the high canopy closure class.

Table V-43. Current Conditions for Canopy Closure Class on the Sawtooth National Forest (Outside of Designated Wilderness), Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size/Canopy Closure Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	Large Low	1.9	-45.6	-67.1	-89.6	-89.6	-22.1	-79.1	-86.1
	Large Mod.	10.9	+10.9	+10.9	+10.9	+10.9	+10.9	+10.9	+10.9
	Large High	0	0	0	0	0	0	0	0
PVG 2	Large Low	1.8	- 6.2	-58.2	-66.2	-66.2	- 2.2	-69.2	-39.2
	Large Mod.	5.2	-45.8	- 5.8	- 6.8	- 6.8	-20.8	- 6.8	-22.8
	Large High	4.7	+ 4.7	+ 4.7	+ 4.7	+ 4.7	+ 4.7	+ 4.7	+ 4.7
PVG 3	Large Low	1.3	+ 1.3	- 3.7	- 4.7	- 4.7	+ 1.3	- 5.7	- 3.7
	Large Mod.	10.2	-12.8	-16.8	-24.8	-24.8	- 9.8	-30.8	-28.8
	Large High	2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9	+ 2.9
PVG 4	Large Low	2.3	+ 2.3	+ 1.3	+ 1.3	+ 1.3	+ 2.3	+ 1.3	+ 1.3
	Large Mod.	8.3	-11.7	-17.7	-24.7	-24.7	-11.7	-21.7	-21.7
	Large High	4.5	+ 4.5	+ 4.5	+ 4.5	+ 4.5	+ 4.5	+ 4.5	+ 4.5
PVG 5	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Mod.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Mod.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	Large Low	2.5	- 0.5	+ 1.5	+ 1.5	+ 1.5	- 4.5	+ 1.5	+ 0.5
	Large Mod.	11.6	+ 4.6	- 7.4	- 8.4	- 8.4	- 1.4	- 7.4	- 7.4
	Large High	7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5	+ 7.5
PVG 8/9	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Mod.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10	Medium Low	1.3	+ 1.3	+ 1.3	+ 1.3	+ 1.3	+ 1.3	+ 1.3	+ 1.3
	Medium Mod.	23.5	+18.5	+ 5.5	+ 5.5	+ 5.5	+14.5	+ 5.5	+ 8.5
	Medium High	2.6	- 3.4	+ 0.6	+ 0.6	+ 0.6	- 8.4	+ 0.6	- 2.4
PVG 11	Large Low	0.9	- 8.1	- 0.1	- 1.1	- 1.1	-12.1	- 1.1	- 2.1
	Large Mod.	5.8	+ 0.8	-14.2	-19.2	-19.2	- 1.2	-18.2	-17.2
	Large High	1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7	+ 1.7

*PVG 10 refers to Medium Tree Size Class

Table V-44. Comparison Results for Canopy Closure Class on the Sawtooth National Forest (Outside of Designated Wilderness), Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size/Canopy Closure Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	Large Low Large Mod. Large High	1.9 10.9 0	Out	Out	Out	Out	Out	Out	Out
2	Large Low Large Mod. Large High	1.8 5.2 4.7	Out	Out	Out	Out	Out	Out	Out
3	Large Low Large Mod. Large High	1.3 10.2 2.9	Out	Out	Out	Out	Out	Out	Out
4	Large Low Large Mod. Large High	2.3 8.3 4.5	Out	Out	Out	Out	Out	Out	Out
5	Large Low Large Mod. Large High	N/A N/A N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Large Low Large Mod. Large High	N/A N/A N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Large Low Large Mod. Large High	2.5 11.6 7.5	**In**	Out	Out	Out	**In**	Out	**In**
8/9	Large Low Large Mod. Large High	N/A N/A N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Large Low Large Mod. Large High	1.3 23.5 2.6	Out	**In**	**In**	**In**	Out	**In**	Out
11	Large Low Large Mod. Large High	0.9 5.8 1.7	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

Table V-45 shows the amount of variation from the DC in areas inside of designated wilderness, and displays the results of the analysis. The current conditions for PVG 10 meet the desired conditions for medium tree canopy closure classes. The current conditions for large tree canopy closure class do not meet the desired conditions for any other PVG. In general, most PVGs display an abundance of acres in denser canopy closure classes than what would be desired and a paucity of acres in the less dense canopy closure classes.

Table V-45. Current Conditions for Canopy Closure Class on the Sawtooth National Forest (Inside of Designated Wilderness), Compared with Desired Conditions, Expressed as a Percent of Total Acreage

PVG	Size/Canopy Closure Classes	Current	Difference from Desired Condition	Within Desired Conditions
1	Large Low Large Moderate Large High	0.7 3.4 0	-90.3 + 3.4 0	Out
2	Large Low Large Moderate Large High	1.0 16.8 3.3	-64.0 - 4.8 + 3.3	Out
3	Large Low Large Moderate Large High	1.4 16.5 1.7	- 4.6 -18.5 + 1.7	Out
4	Large Low Large Moderate Large High	1.0 10.7 2.1	0 -22.3 + 2.1	Out
5/6		N/A	N/A	N/A
7	Large Low Large Moderate Large High	0.5 3.9 0.8	- 0.5 -16.1 + 0.8	Out
8/9		N/A	N/A	N/A
10*	Medium Low Medium Moderate Medium High	3.4 18.4 1.4	+ 3.4 + 0.4 - 0.6	**In**
11	Large Low Large Moderate Large High	0.1 0.5 0.2	- 1.9 -24.5 + 0.2	Out

*PVG 10 refers to Medium Tree Size Class

Species Composition - Species composition desired conditions do not vary between alternatives and are interpreted to be the range of HRV. Therefore, the comparison with the DC would be the same as the comparison with HRV discussed above under Comparison of Current Condition with Historical Estimates.

Summary of Current Conditions for Forested Vegetation

In general, the current condition for large tree size and canopy closure classes deviate the most often from the HRV estimates. When compared with the mean of HRV, only PVG 7 and 10 on the Sawtooth National Forest and PVG 10 in the Payette and Sawtooth Wilderness are within the historical estimate for size class. The grass/forb/shrub/seedling size class is generally higher than historical estimates, but not in all cases.

There is only one instance where the current canopy closure distribution is within the historical estimates. This is PVG 10 on the Sawtooth National Forest. All PVGs with historically rare amounts of area in certain canopy closure groups (generally high canopy closure) currently contain acres in this condition.

Regarding the current condition of size classes compared to the DCs, which represent a broader range across and beyond the HRV estimates, only PVG 7 on the Sawtooth for Alternatives 2, 3, 5, and 7 are within DC, PVG 10 in Alternatives 3, 5, 6, and 7, and PVG 11 in Alternative 1B. In the Payette and Sawtooth Wilderness, PVG 10 meets the DC for size class. The canopy closure comparison with DC is marginally better with PVG 7 in Alternative 1B on the Boise and Payette National Forests being within the DC. On the Boise National Forest, PVG 6 for Alternative 5, and PVG 10 for Alternatives 2, 3, 4 and 6 are within the DC. For the Sawtooth National Forest, PVG 7 for Alternatives 1B, 5, and 7, and PVG 10 for Alternatives 2, 3, 4, and 6 are within the DCs, and PVG 10 is within DC in the Sawtooth Wilderness.

In general, current species composition has shifted from seral to climax in many PVGs compared to the HRV. Some of these changes are particularly evident in PVGs that historically maintained a large portion of the area in seral species due primarily to fire. For example, in PVGs 1 and 2 the predominate cover type was ponderosa pine, which is adapted to the frequent, nonlethal fires that were common in these PVGs. Many factors have produced a shift from ponderosa pine toward climax Douglas-fir in portions of these PVGs. In these areas, the amount of ponderosa pine has declined below the estimated historical levels and Douglas-fir has increased. Even seral species that were not a dominant feature on the landscape have declined below historical estimates. Both western larch and whitebark pine, seral species in the grand fir and subalpine fir PVGs, have in most cases declined. Whitebark pine, in particular, is experiencing high mortality rates due to a host of factors, but especially blister rust (Smith and Hoffman 2000). While some of these agents caused mortality in historical times, regeneration has declined with the advent of fire exclusion. In addition, mortality of smaller-diameter trees has been greater than in larger-diameter trees (Smith and Hoffman 2000), further reducing opportunities to retain whitebark pine on the landscape over the long term. PVGs 4, 7, and 10 on the Payette National Forest, PVGs 3, 4, 7, and 10 on the Boise National Forest, and PVGs 3, 4, and 10 on the Sawtooth National Forest are within historical ranges for species composition/seral status.

When considering all three of these components together (size class, canopy closure, and species composition), only PVG 10 on the Sawtooth National Forest is within the HRV for all three components for the current condition. When considering if the current condition meets a desired condition for all three components, PVG 10 on the Sawtooth National Forest meets the DCs for Alternatives 3 and 6, and PVG 10 in the Sawtooth Wilderness. None of the other PVGs meet the HRV or their respective DCs.

As the results display, factors such as the combined influences of fire exclusion, timber harvest, roads construction, and agriculture have affected vegetative communities. Fire exclusion has resulted in stands developing uncharacteristically high levels of tree density, fuel loading, and climax species. This has resulted in an increase in uncharacteristic lethal wildfires. Though the average wildfire occurrence per year (329 fires) from lightning and human-caused ignitions has remained relatively static over time within the Ecogroup between 1991 and 2000, wildfires burned approximately 1,209,782 acres. Ninety-three percent of these burned acres were on the Boise and Payette Forests. More information on the amounts and rates of wildfires is available in the *Vegetation Hazard* and *Fire Management* sections of this Chapter. In some areas, these fires burned lethally through vegetative communities that historically burned non-lethally. This resulted in large areas of early seral vegetation, extensive mortality of large trees, changes in landscape patterns, loss of investments such as plantations, and introduction and spread of non-native plants and noxious weeds. Conversely, commodity production from fire salvage sales provided economic and social benefits to many people in the form of jobs, income, and wood fiber. In many harvested areas, stand densities and species composition have been substantially altered, generally resulting in a reduction of large-sized, high-valued tree species. Roads and other developments have also contributed to these declines.

Some PVGs, such as PVG 1, face significant threats due to losses outside of National Forest System lands and from the large deviations from historic and desired conditions on National Forest System lands. Although comprising a small amount of total acreage in the Ecogroup, the current condition in this PVG reflects long-terms needs for restoration and conservation. Other PVGs have large deviations from historic and desired conditions, and contain high values for biodiversity and/or face multitudes of threats or trajectories that warrant long-term management strategies. The results found in the Ecogroup area mimic those found by the ICBEMP study.

Current Condition for Snags and Coarse Woody Debris

Forested PVGs share similar environmental characteristics and site productivity. For snags and coarse woody debris, the amounts, sizes, and distribution of material are related to the PVG (Brown and See 1981, Harris 1999). PVGs reflect not only the site productivity, but also the frequency and severity of wildfire. The PVGs describe the tree species that occur on a site, which in turn provide information about potential mortality agents (insects, diseases, wind, fire, etc.), snag fall-down and decay rates, and other ecological processes.

Diameter classes for snags and coarse woody debris were broken into three categories; only medium and large classes were analyzed since these are the classes with desired conditions:

1. Small: 3”- 9.9” DBH
2. Medium: 10”- 19.9” DBH
3. Large: > 20” DBH

These categories were based on the needs for long-term soil productivity and wildlife uses for primary cavity nesters and other species (Thomas et al. 1979, Bull et al. 1986, Spahr et al. 1991, Wright and Wales 1993, Blair and Servheen 1995, Agee 1998, Flanagan et al. 1998, Roloff et al. 1998, Saab and Dudley 1998, Wisdom et al. 2000), assuming the landscape provides a range of diameter sizes to accommodate the habitat needs of many species (Saab and Dudley 1998, Wisdom et al. 2000). Snags and down logs should also be present in a variety of decay classes. However, the current data set does not provide direct information on decay classes, only diameter sizes and quantities of material.

Forest inventory data, collected as part of the Forest Inventory and Analysis program, was analyzed for each Ecogroup Forest to determine current amounts of snags and down logs, by diameter class, in each PVG. Wilderness areas were not included in the inventories, contributing to an underestimation in the overall numbers of snags and down logs. Therefore, this data is more representative of managed areas across the Ecogroup. Data was summarized for all inventory sites classified as forestland; data from non-forested sites was not included. Averages were taken for all inventory sites with tree data, not just those that contained snags and down logs. This represents the most accurate data available to estimate the current condition for snags and down logs. Habitat type was also recorded at each inventory location, except where recent disturbance made it impossible to determine. In some cases, inventory points were assigned to multiple PVGs. Site-specific information about disturbances and distributions of coarse wood are lacking.

Standing dead trees were inventoried as snags if they were at least 6 feet tall. Revised Forest Plan guidelines recommend that snags have minimum heights that are either 15 or 30 feet, depending on PVG, as identified by the needs of primary cavity nesters. The actual height of snags was not recorded; therefore, it is not possible to fully determine whether current conditions meet revised Forest-wide guidelines. Down logs were recorded during forest inventory if less than 6 feet of the dead tree remained standing.

A mathematical comparison was used to determine whether or not the inventoried values deviate from the estimated distribution of historical. This analysis assisted with the determination of whether or not the current condition numbers are within the historical range.

For coarse woody debris, down logs are tallied as part of the inventory as trees per acre. Because our historical/desired conditions are expressed as tons per acre, we converted this value using total bole weight in tons per acre of wood and bark based on whole tree volume equations, wood density, and bark-to-wood ratios for ponderosa pine and Douglas-fir (Brown et al. 2001). For PVGs 7 and 8/9 we used the same equations since Douglas-fir is a component of these PVGs and lodgepole pine, another component, has a similar wood density to ponderosa pine. For PVGs 10 and 11 only the values for ponderosa pine are used, to estimate the values for lodgepole and whitebark pine. It is recognized that we have probably overestimated the tons per acre in stands with large components of subalpine fir or Englemann spruce. However, for the 10-19.9-inch diameter class, we used the calculations as if all trees were 10 inches in diameter. For the greater than 20-inch diameter class, we again calculated tons per acre as if all trees were 20 inches diameters. This would have compensated for any differences based on weights of different species of trees and may have underestimated coarse woody debris in some cases.

Payette National Forest - Current snag and coarse woody debris conditions for the Payette are described in Table V-46. The Payette inventory has some differences from the other two National Forests in terms of how the data were collected. The most important difference is that snags and down logs are tallied together, and therefore, could not be separated out for analysis. For the purpose of this analysis, we are calling them all snags with the understanding that some of the numbers contributing to the averages came from down logs. Inventory plots were assigned to PVGs, based on habitat typing recorded for the plots. Table V-47 displays the differences between current condition and historical/desired conditions and the results of analysis. A PVG is considered within historical/desired conditions if the values of both diameter classes are within or close to the range, based on a mathematical comparison.

Table V-46. Average Number of Snags and Down Logs/Acre by Diameter Class and PVG for the Payette National Forest

Diameter Class	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	0.6	1.7	1.3	0.8	3.7	4.9	11.2	18.5	4.5	12.7
>20"	0.3	0.7	0.8	0.2	1.0	1.5	2.0	3.3	0.7	3.6
Total	0.9	2.4	2.1	1.0	4.7	6.4	13.2	21.8	5.2	16.3

Table V-47. Differences between Historical/Desired Conditions of Snags/Down Logs for the Payette National Forest

Diameter Class	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	**In**	- 0.1	- 0.5	-1.0	**In**	**In**	+ 5.7	+11.0	**In**	+10.5
>20"	- 0.1	**In**	**In**	**In**	**In**	**In**	**In**	+ 0.3	N/A	+ 1.4
Total	**In**	**In**	**In**	-1.0	**In**	**In**	+ 4.2	+11.3	**In**	+11.9
Within Historical/ Desired	**In**	**In**	**In**	**In**	**In**	**In**	Out	Out	**In**	Out

It is more difficult to draw conclusions from these data, mainly because snags and down logs could not be separated from each other. Generally, the subalpine fir PVGs contain higher numbers. The drier ponderosa pine and Douglas-fir PVGs contain lesser amounts. This pattern agrees with Spies and Cline (1988), who found that stands on dry sites have fewer snags and down logs than those of the same age on moist sites.

In general, current conditions appear to meet the historical/desired conditions for numbers of snags. However, it is not possible to distinguish snags from down logs with these data and if snags met the height requirements. Therefore, it is possible in some cases that the number of snags has been overestimated. In PVG 1, the current condition is below recommendations for the greater than 20-inch diameter snags (even with down logs included). This is in spite of the fact that this PVG has a high capability to produce large-diameter trees, as it contains long-lived species. It is still within the range for meeting the historical/desired conditions when combined with snags in the 10-19-inch diameter class. The same holds true for PVGs 2, 3, and 4; although lacking in snag numbers in the 10–19-inch diameter class, they are within range to meet the historical/desired conditions when all classes are considered together. In PVGs 7, 8/9, and 11, the high number of snags and down logs in all diameter classes probably represents a pulse of mortality; reflecting mortality from spruce bark beetle epidemic and subsequent wildfires that have occurred in these types.

Boise National Forest - Current snag conditions for the Boise National Forest are described in Tables V-48. Table V-49 displays the differences between current condition and historical/desired conditions and the results of analysis.

Table V-48. Average Number of Snags/Acre by Diameter Class and PVG for the Boise National Forest

Diameter Class	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	0.9	4.8	6.2	4.8	3.3	7.2	12.1	N/A	11.2	8.1
>20"	1.8	1.4	3.2	1.6	0.4	4.3	2.3	N/A	N/A	0.2
Total	2.7	6.2	9.4	6.4	3.7	11.5	14.4	N/A	13.1	8.3

Table V-49. Differences with Historical/Desired Conditions Snags for the Boise National Forest

Diameter Class	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	**In**	+ 2.1	+ 2.1	+ 2.1	**In**	+ 1.7	+ 6.6	N/A	+ 3.5	+ 5.9
>20"	**In**	**In**	+ 0.4	**In**	**In**	+ 0.8	**In**	N/A	N/A	- 1.2
Total	**In**	+ 0.5	+ 2.5	+ 1.6	**In**	+ 2.5	+ 5.4	N/A	+ 3.5	+ 3.9
Within Historical/ Desired	**In**	**In**	**In**	**In**	**In**	**In**	Out	N/A	**In**	Out

Generally, the warm and moist grand fir and subalpine fir PVGs contain higher overall numbers of snags. The drier ponderosa pine, Douglas-fir, and grand fir PVGs contain lesser amounts of snags. This finding agrees with the literature, which states that stands on dry sites have fewer snags and down logs than those of the same age on moist sites (Spies and Cline 1988). The tallest snags, however, are found in drier types (ponderosa pine, Douglas-fir, grand fir) where decay rates are slower. PVGs 2, 3, 4, and 10 all contain more snags in the 10-19.9-inch diameter class than would be estimated under historical, however, overall they are within range for the historical/desired conditions. PVG 6 has more snags of all sizes than historical; however, they are also within range for historical/desired conditions considering a mathematical comparison, since the deviations are small. PVGs 7 and 11 have too many snags and do not meet the historical/desired conditions. In PVGs 7 and 11, the high number of snags in all diameter classes probably represents a pulse of mortality; reflecting mortality from spruce bark beetle epidemic and subsequent wildfires that have occurred in these types. PVG 1 is within historical/desired conditions.

Table V-50 displays the current condition for coarse woody debris (down logs). Conditions that are within the historical/desired conditions are bold-faced in the table. None of the PVGs meet the historical/desired conditions for coarse woody debris when compared with total tons/acre. We also looked at the distribution of coarse wood with diameters greater than 20 inches. PVG 1, 6, and 11 met the desired distribution. The desired distribution is actually for trees greater than 15 inches diameter, so many of the other PVGs may meet the desired conditions as they all had a higher proportion of larger trees to smaller ones; however, we could not fully evaluate this since our data was divided into a class broken out at >20 inches diameter. All PVGs were below the desired conditions for coarse woody debris. This is most likely due to past history of fire suppression that has decreased mortality, changes in fire regimes, timber harvest, and firewood gathering. Overall, the recruitment pool to create future coarse woody debris appears favorable when considering the values for snags, particularly larger ones.

Table V-50. Average Tons of Coarse Woody Debris/Acre by Diameter Class and PVG For the Boise National Forest (Trees per Acre in parenthesis)

Diameter Class	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	0.1 (0.3)	0.4 (2.1)	0.2 (1.1)	0.2 (0.9)	0.6 (2.9)	0.5 (2.7)	1.0 (5.1)	N/A	1.2 (6.1)	1.6 (8.3)
>20"	1.2 (0.9)	0.4 (0.3)	0.3 (0.2)	0.5 (0.4)	0.9 (0.7)	1.9 (1.5)	0.9 (0.7)	N/A	N/A	0.6 (0.5)
Total	1.3	0.8	0.5	0.7	1.5	2.4	1.9	N/A	1.2	2.2
Distribution >20" DBH	**92%**	50%	60%	71%	60%	**79%**	47%	N/A	*	**27%**

*Could not be determined with available data

Sawtooth National Forest - Current snag conditions for the Sawtooth National Forest are displayed in Table V-51. Table V-52 displays the differences between current condition and historical/desired conditions and the results of analysis. PVGs 2 and 3 were combined, as habitat type data were not available to adequately classify these into PVG groups.

Table V-51. Average Number of Snags/Acre by Diameter Class and PVG for the Sawtooth National Forest

Diameter Class	PVG 1	PVG 2/3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	1.0	15.5	4.2	N/A	N/A	9.4	N/A	8.0	7.7
>20"	1.5	2.8	1.2	N/A	N/A	0.3	N/A	N/A	2.2
Total	2.5	18.3	5.4	N/A	N/A	9.7	N/A	8.0	9.9

PVGs 4, 7, and 10 all contain more snags in the 10-19.9-inch diameter class than estimated historical; however, overall they are within range for the historical/desired conditions. PVG 2/3 and PVG 11 have more snags than historical and are not within the historical/desired conditions. PVG 1 is within the historical/desired conditions. PVGs 1, 4, 7, and 10 are within the historical/desired conditions.

Table V-52. Differences with Historical/Desired Conditions Snags for the Sawtooth National Forest

Diameter Class	PVG 1	PVG 2/3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	**IN**	+11.4	+ 1.5	N/A	N/A	+ 3.9	N/A	+ 0.3	+ 5.5
>20"	**IN**	**IN**	**IN**	N/A	N/A	**IN**	N/A	N/A	**IN**
Total	**IN**	+11.4	+ 0.6	N/A	N/A	+ 0.7	N/A	+ 0.3	+ 5.5
Within Historical/ Desired	**In**	Out	**In**	N/A	N/A	**In**	N/A	**In**	Out

Table V-53 displays the current condition for coarse woody debris (down logs). Conditions that are within the historical/desired conditions are bold-faced in the table.

Table V-53. Average Tons of Coarse Woody Debris/Acre by Diameter Class and PVG for the Sawtooth National Forest (Trees per Acre in parenthesis)

Diameter Class	PVG 1	PVG 2/3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
10-19.9"	3.0 (0)	0.4 (2.2)	0.2 (1.0)	N/A	N/A	1.3 (6.6)	N/A	1.0 (5.1)	0.8 (4.1)
>20"	0.3 (0.2)	0.4 (0.3)	0.4 (0.3)	N/A	N/A	0.1 (0.1)	N/A	N/A	0.9 (0.7)
Total	0.3	0.8	0.6	N/A	N/A	1.4	N/A	1.0	1.7
Distribution >20" DBH	**100%**	50%	**67%**	N/A	N/A	7%	N/A	*	**53%**

*Could not be determined with available data

No PVGs meet the historical/desired conditions for coarse woody debris when compared with total tons/acre. We also looked at the distribution of coarse wood with diameters greater than 20 inches. PVGs 1, 4, and 11 met the desired distribution. The desired distribution is actually for trees greater than 15 inches diameter, so many of the other PVGs may meet the desired conditions as they all had a higher proportion of larger trees to smaller one; we could not fully evaluate this since our data was broken into a larger class broken out at >20-inch diameter. All PVGs were below the historical/desired conditions for coarse woody debris. This is most likely due to past history of fire suppression that has decreased mortality, changes in fire regimes, timber harvest, and firewood gathering. Recent timber harvest is less on the Sawtooth than the other two Forests, so this may not be as much of a factor. Overall coarse woody debris values are greater in the subalpine fir and lodgepole pine PVGs where large pulses of down wood are common in the lodgepole pine types and wood decays at a slower rate and persists longer on the landscape. Overall, the recruitment pool to create future coarse woody debris appears favorable when considering the values for snags, particularly larger ones.

Summary of Current Conditions for Snags and Coarse Woody Debris

We have examined the current condition of snags and coarse woody debris at the scale of an entire National Forest. Overall, the conditions of snags are within or close to historical/desired conditions, and coarse woody debris is below the historical/desired condition. The large-scale fires of 1994 and 2000 have contributed to the large pulses of snags currently on the landscape. However, several assumptions should be considered at scales below the Forest-wide. Some of these assumptions are based on material from ICBEMP (2000a).

- In areas without past timber management and with fire exclusion, the number of snags and amounts of coarse woody debris are probably above historical levels.

- In areas adjacent to roads, snags and coarse woody debris are probably below historical levels due to fuelwood cutting, timber harvest, and removal for safety concerns.

- In areas with past timber management, where snags and coarse woody debris were not considered in management activities, the number of snags and amount of coarse woody debris are below historical levels.

- Levels of coarse woody debris should increase in those areas where fires have created high numbers of snags.

Tree densities have increased in interior western forests (Covington et al. 1994), which is also documented by our current condition for canopy closure for forested vegetation. Fire suppression activities limited the number and extent of fires over the past century, and these altered fire regimes have increased stand density and changes in species composition. Large wildfires now create pulses of snags in excess of estimated historical conditions (Everett et al. 1999). Should post-fire snag fall exceed snag recruitment, then “gaps” in snag habitat can occur over time (Bull 1983, Harmon et al. 1986). Although we have evaluated Forest-wide levels of snags and coarse woody debris, project-level analysis should consider local conditions, as the amounts of snags and coarse woody debris can vary substantially over space and time.

Ecogroup Current Condition Of Non-Forested Vegetation

A multitude of non-forested cover types exist at the Ecogroup scale. Not all were analyzed in significant detail. The cover types analyzed were selected based upon their: (1) significant broad-scale ecological effect, (2) extensive contribution to the vegetative landscape, (3) current condition, (4) ability to reflect change or trends of other associated cover types, or (5) connection to current issues or concerns. Some of these types, although comprising a small percentage of the Ecogroup acreage, have high value either because they have been severely altered, particularly outside of National Forest System lands, they are inherently rare yet provide important habitat for various organisms, or the current condition and projected trajectories place them at high risk. For these reasons, all types are treated equally in the analysis, regardless of total acreage. It is important to differentiate between sagebrush species and subspecies in order to classify rangeland types; to understand site potential, palatability to livestock and wildlife, and response to fire; and to manage vegetation (Paige and Ritter 1999). Table V-54 highlights those cover types analyzed in detail through predictive modeling (see Appendix B). Although climax aspen and pinyon-juniper are tree species, they are grouped here with shrub cover types, as a similar modeling process was used. Table V-55 describes the canopy covers evaluated for shrub species. Table V-56 and Table V-57 highlight the size and canopy cover classes used for the climax aspen and pinyon-juniper analysis.

Table V-54. Non-Forest Vegetation Types

Mountain Big Sagebrush
Mountain Big Sagebrush with Chokecherry, Serviceberry, and Rose
Mountain Big Sagebrush with Snowberry
Mountain Big Sagebrush with Bitterbrush
Basin Big Sagebrush
Low Sagebrush
Wyoming Big Sagebrush
Mountain Big Sagebrush with Pinyon-Juniper
Wyoming Big Sagebrush with Pinyon-Juniper
Climax Aspen
Pinyon-Juniper

Table V-55. Shrub Canopy Cover Classes

Non-stocked or Non-forested	Non-forested vegetation cover types - may include some conifer tree cover but less than 10 percent total cover. May also include forest vegetation cover types, regardless of density, if in the grass/forb/shrub/seedling size class.
Low	Canopy cover ranges from 0 to 10 percent.
Medium	Canopy cover ranges from 11 to 20 percent.
High	Canopy cover ranges from 21 to 30 percent.
Very High	Canopy cover is greater than 31 percent (only used with mountain big sagebrush types)

Table V-56. Tree Size Classes (Aspen and Pinyon-Juniper)

Grass/Forb/ Shrub/Seedling	Trees less than 1.0 inch in diameter, and areas without trees but capable of or previously having forest tree cover. All canopy cover densities, 0 to 100 percent may be present.
Saplings	Trees range from 1.0 inch to 4.9 inches in diameter. Canopy cover is at least 10 percent.
Small Trees	Trees range from 5.0 to 11.9 inches in diameter. Canopy cover is at least 10 percent.
Medium Trees	Trees range from 12.0 to 19.9 inches in diameter. Canopy cover is at least 10 percent.
Large Trees	Trees are 20.0 inches or more in diameter. Canopy cover is at least 10 percent.

Table V-57. Canopy Cover Classes (Aspen and Pinyon-Juniper)

Non-stocked or Non-forested	Non-forested vegetation cover types - may include some conifer tree cover but less than 10 percent total cover. May also include forest vegetation cover types, regardless of density, if in the grass/forb/shrub/seedling size class.
Low	Canopy cover ranges from 10 to 39 percent.
Moderate	Canopy cover ranges from 40 to 69 percent.
High	Canopy cover is 70 percent or greater.

Reference Conditions

We utilized the Draft Properly Functioning Condition Process (USDA Forest Service 1996) to assist with determinations of the HRV. Properly functioning condition describes a state in which the risk of losing biological and physical components becomes greater as vegetation types move further away from a properly functioning condition state. Several vegetative attributes or components, such as composition, structure, disturbance, and landscape patterns, are used to describe properly functioning condition and determine a landscape's risk of departure (USDA Forest Service 1996). The concept of historical range of variation is incorporated as a part of these components.

Historical Range of Variability - Historic sagebrush canopy closures were variable, but typically the extent of cover densities fell within the following ranges (USDA Forest Service 1996):

- 10 percent of the Ecogroup area had a 0 to 5 percent shrub crown or canopy closure,
- 50 percent of the Ecogroup area had a 6 to 15 percent shrub crown or canopy closure, and
- 40 percent of the Ecogroup area had a shrub crown or canopy closure of over 15 percent.

Historic woodland structural stages were fairly evenly distributed and typically fell within the following ranges (USDA Forest Service 1996):

- 10 percent was in grass/forb stage,
- 10 percent in seedling/sapling stage,
- 20 percent in a young forest,
- 20 percent in a mid aged forest,
- 40 percent in a mature or old forest.

Some interpretations of these values were made in order to crosswalk them to the size and canopy cover classes. Historical values used for the size and canopy cover classes are presented in the tables comparing historical estimates to the current condition.

Desired Conditions (DCs)

Our DCs are based on the structure recommendations from the properly functioning condition assessment, as these can easily be expressed numerically at the broad scale of a Forest Plan. We crosswalked canopy cover classes in the properly functioning condition assessment to the canopy cover classes we use. Canopy cover can be used as an indicator to define successional change, ecological condition, and disturbance regime influence. Furthermore, the overstory of shrubs provides a direct correlation to their competitive influence on herbaceous understory composition and productivity.

The assumption used for the mountain big sagebrush types and basin big sagebrush types was that the recommended properly functioning condition is in the middle of the historical range. In examining the themes of the seven alternatives, we spread these out along the presumed range (from low end of the historical range of variability to the high end) based on the themes of the alternatives and desired biological, physical, social, and economic conditions. All alternatives were assumed to be within the historical range, except for Alternative 5, which was below the low end (Figure V-2). Alternatives 3 and 4 are at the mid-range of HRV, arriving there either through restoration efforts or ecological processes. Alternative 6 was toward the higher end of HRV through efforts toward maintaining roadless character. Alternative 2 is between the mid-range of HRV and the low end, while Alternative 7 is between Alternative 2 and the mid-range. Table V-58 describes the desired conditions for mountain and basin big sagebrush types.

Figure V-2. Relationship of Desired Conditions to Historical Range of Variability by Alternative for Mountain Big Sagebrush Types and Basin Big Sagebrush

Historical Range of Variability

Low end ←--→ High end

| Alt. 5 | Alt. 1B | Alt. 2 | Alt. 7 | Alt. 3, Alt. 4 | Alt. 6

Table V-58. Desired Condition Values for Mountain and Basin Big Sagebrush Cover Types, Expressed as Percents of Total Acreage

Mountain and Basin Big Sagebrush Canopy Cover Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
0-10% canopy cover	50%	35-45%	34%	34%	>50%	25-30%	30-40%
11-20% canopy cover	25%	30-40%	33%	33%	<25%	20-35%	30-40%
21-30%, >31% canopy cover	25%	15-30%	33%	33%	<25%	30-40%	20-30%

The assumption used for the Wyoming big sagebrush type was that it is in a high-risk situation involving disrupted fire cycles and the invasion of cheatgrass and other weedy species. Therefore, a desired condition would be at the high end of HRV for those alternatives (3, 4, and 6) whose themes entail restoration and/or minimizing management disturbance. This is accomplished by minimizing risk through activities such as fire suppression, and initiating restoration activities on a smaller amount of acres than we would for other sagebrush types, thus leading to a larger proportion of acres in the greater density classes. Alternatives 2 and 7 have themes that would entail a small amount of risk as we meet different multiple objectives, so they were placed between the high end of HRV and the middle of HRV for the Wyoming big sagebrush type. Alternative 1B is still the low end of HRV, and Alternative 5 is below the low end of HRV, as shown in Figure V-3. Table V-59 displays these values.

Figure V-3. Relationship of Desired Conditions to Historical Range of Variability by Alternative for Wyoming Big Sagebrush

```
                          Historical Range of Variability
              Low end                                              High end
              ←-----------------------------------------------------------------
|             |                        |              |          |
Alt. 5      Alt. 1B                                 Alt. 2, Alt. 7   Alt. 3, Alt. 4, Alt. 6
```

Table V-59. Desired Condition Values for Wyoming Big Sagebrush Cover Types, Expressed as Percents of Total Acreage

Wyoming Big Sagebrush Canopy Cover Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
0-10% canopy cover	50%	25-30%	<25%	<25%	>50%	<25%	25-30%
11-20% canopy cover	25%	20-35%	20-40%	20-40%	<25%	20-40%	20-35%
21-30%, >31% canopy cover	25%	30-40%	>40%	>40%	<25%	>40%	30-40%

Figure V-4 shows the relationship of DC to HRV for low sagebrush. The assumption used for the low sagebrush type was that in any alternative the vast majority of acres would be in the lowest density class (0-10 percent), with only a very few acres advancing to a greater density class (Table V-60). This is due to the inherent biological and physical characteristics of low sagebrush types; any departure from this under any alternative would indicate the sustainability of this type could be exceeded by changing fire cycles and influencing native herbaceous understory (Longland and Young 1995).

Figure V-4. Relationship of Desired Conditions to Historical Range of Variability by Alternative for Low Sagebrush

```
                          Historical Range of Variability
              Low end                                              High end
              ←-----------------------------------------------------------------→
                                       |
                                       All Alternatives
```

Table V-60. Desired Condition Values for Low Sagebrush Cover Types, Expressed as Percents of Total Acreage

Low Sagebrush Canopy Cover Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt. 5	Alt 6	Alt 7
0-10% canopy cover	>90%	>90%	>90%	>90%	>90%	>90%	>90%
11-20% canopy cover	<10%	<10%	<10%	<10%	<10%	<10%	<10%
21-30%, >31% canopy cover	0%	0%	0%	0%	0%	0%	0%

In the woodland types (climax aspen and pinyon-juniper), structure is a means to express the balance of age and size classes that will provide adequate recruitment to sustain a range of age classes. The desired conditions are based on the structure recommendations from the properly functioning condition assessment, as these can easily be expressed numerically at the broad scale of a Forest Plan. We crosswalked the age classes in the properly functioning condition assessment to the size and canopy cover classes we use. Size and canopy cover can be used as an indicator to define successional change, ecological condition, and disturbance regime influence more effectively. Furthermore, the overstory of woodland trees provides a direct correlation to their competitive influence on herbaceous understory composition and productivity.

The assumption used was that the recommended properly functioning condition is in the middle of the historical range. The seven alternatives were spread out along the presumed range (from low end of the historical range of variability to the high end), based on the theme of the alternative and desired biological, physical, social, and economic conditions. All alternatives were assumed to be within the historical range, except for Alternative 5, which was below the low end. Alternative 7 for climax aspen and pinyon-juniper is between the mid-range of HRV and the low end of HRV, as reflected in the desired condition values. For climax aspen, Alternatives 4 and 6 are slightly lower than the mid-range of HRV, due to the role of fire in fostering ecological processes in this type. Alternative 2 is slightly below Alternatives 4 and 6. Figure V-5 displays these relationships for climax aspen and Figure V-6 displays the relationships for pinyon-juniper. In pinyon-juniper, the distribution is similar; however, Alternatives 4 and 6 are more toward the higher end of HRV, as fire cycles are not as frequent as in climax aspen. Tables V-61 and V-62 display these values.

Figure V-5. Relationship of Desired Conditions to Historical Range of Variability by Alternative for Climax Aspen

```
                              Historical Range of Variability
                     Low end                                              High end
                     ←------------------------------------------------------------→
  |                  |               |     |      |   |
 Alt. 5           Alt. 1B         Alt. 7 Alt. 2 Alt. 4 Alt. 3
                                                Alt. 6
```

Figure V-6. Relationship of Desired Conditions to Historical Range of Variability by Alternative for Pinyon-Juniper

Historical Range of Variability

Low end ←------------------------------------→ High end

Alt. 5 | Alt. 1B | Alt. 7 | Alt. 2 | Alt. 3 | Alt. 4, Alt 6

Table V-61. Desired Condition Values for Climax Aspen Cover Types, Expressed as Percents of Total Acreage

Pinyon-Juniper Size/Canopy Cover Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
GFSS <10% canopy cover	>40%	>40%	40% total	35-45%	>40%	35-45%	>40%
Saplings (o.1-4.9" DBH), all canopy covers	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes
Small (5.0-11.9" DBH), all canopy covers	15-30%	20-35%	30%	25-35%	10-25%	25-35%	20-30%
Medium (12" + DBH), 10-39% canopy cover	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes
Medium (12" + DBH), 40-69% canopy cover	At least 20%	25-30%	At least 30%	At least 30%	10%	At least 30%	20-25%
Medium (12" + DBH), >70% canopy cover	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes

Table V-62. Desired Condition Values for Pinyon-Juniper Cover Types, Expressed as Percents of Total Acreage

Pinyon-Juniper Size/Canopy Cover Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
GFSS <10% canopy cover	15-25%	10-15%	10%	5-10%	15-30%	5-10%	15-20%
Saplings (o.1-4.9" DBH), all canopy covers	15-25%	10-15%	10%	5-10%	15-30%	5-10%	15-20%
Small (5.0-11.9" DBH), all canopy covers	20-30%	20-25%	20%	15-20%	20-35%	15-20%	15-25%
Medium (12" + DBH), 10-39% canopy cover	20-30%	20-25%	20%	15-20%	20-35%	15-20%	15-25%
Medium (12" + DBH), 40-69% canopy cover	25-30%	30-40%	40%	>40%	<25%	>40%	30-35%
Medium (12" + DBH), >70% canopy cover	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes	In these two classes

Current Conditions
Current conditions for non-forested vegetation includes species cover types and canopy covers. These were determined through a remote sensing classification with LANDSAT, developed jointly between the Intermountain Regional Office and staff of the Payette, Boise and Sawtooth National Forests (McClure et al. in press). Appendix B of the EIS and Appendix A of the Forest Plans describe more detail about the mapping process. This mapping covered the Sawtooth National Forest and the Mountain Home Ranger District of the Boise National Forest. This mapping was not completed on the Payette National Forest and the remainder of the Boise National Forest due to the low number of acres of non-forested vegetation found in the cover types analyzed. Non-forested acres in other cover types of the Ecogroup were generated from the LANDSAT coverage generated by the University of Montana (Redmond et al. 1998), updated to include effects of the year 2000 fires, or by the Idaho/Western Wyoming Land Cover classification (Edwards and Homer 1996).

On the Minidoka Ranger District, a different method was used to map the climax aspen and pinyon-juniper stands. Stands were delineated on aerial photos and orthophoto quadrangles. Information associated with each stand was extracted from the Forest's database (Rocky Mountain Resource Information System – RMRIS) and included cover type, tree size class, and canopy cover class. Some additional areas of climax aspen and pinyon-juniper were generated through the LANDSAT mapping for sagebrush, and these acres were added to those acres in the Forest database for purposes of generating the current condition.

Comparison of Current Condition with Historical Estimates
Boise National Forest - Four vegetation types were recognized on the Mountain Home District of the Boise National Forest, with four structural stages or canopy cover classes represented. Table V-63 represents the current condition on the Boise National Forest as a percent of acres in each canopy cover class, and compares this to estimates of the mid-range of HRV to determine if current conditions are within the historical range. The very high class (> 31 percent) was combined with the high class (>21 percent) for all of the analyses. However, they are discussed separately in the Environmental Consequences section. Historical conditions generally represented a balance between age and structural classes, as represented by the canopy cover classes used. The total acreage of mountain big sagebrush is 98,227; with 89,557 acres represented by the pure mountain big sagebrush cover type. The mountain big sagebrush with chokecherry, serviceberry, and rose represented 7,955 acres, mountain big sagebrush with bitterbrush was 545 acres, and mountain big sagebrush with snowberry accounted for 170 acres. Therefore, most sagebrush acres (91 percent) are represented by the pure cover type of mountain big sagebrush. Table V-63 also displays the current and historical conditions as a percent of acres and the actual value of the difference between current and historical. A mathematical comparison is used to determine whether or not the current canopy covers deviate from the estimated distribution of historical. This is analyzed for all three canopy cover classes simultaneously, assisting with the determination of whether or not the entire range of canopy covers is within the historical range.

Table V-63. Current Conditions for the Boise National Forest Non-Forested Types, Expressed as a Percent of Total Acreage

Cover Type	Canopy Cover Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference from Historical	Within Historical
Mountain Big Sagebrush	0-10% 11-20% >21%	69.0 8.6 22.5	34 33 33	+35.0% -24.4% -27.0%	Out
Mountain Big Sagebrush with chokecherry, serviceberry, rose	0-10% 11-20% >21%	5.4 88.6 6.0	34 33 33	-28.6% +55.6% -27.0%	Out
Mountain Big Sagebrush with snowberry	0-10% 11-20% >21%	0.0 18.8 81.2	34 33 33	-34.0% -14.2% +48.2%	Out
Mountain Big Sagebrush with bitterbrush	0-10% 11-20% >21%	29.7 54.0 16.3	34 33 33	-4.3% +21% -16.7%	Out

In the mountain big sagebrush cover type, there is currently an overabundance of acreage in the low canopy cover class (0-10 percent), primarily as a result of the Foothills Fire that occurred in 1992. Past management and other disturbances could have also contributed to this condition. However, this situation does not hold true for other mountain big sagebrush communities; mountain big sagebrush with chokecherry, serviceberry, and rose has a large abundance in the medium (11-20 percent) canopy cover class, mountain big sagebrush with snowberry has a large abundance in the high canopy cover class (>21 percent), and mountain big sagebrush with bitterbrush is more balanced, with the greatest amount in the medium canopy cover class. None of the classes are within historical conditions. Spatially, most of the acres in these types did not overlap with the Foothills Fire, nor any other recent fire, which explains why they are not dominated by the low canopy cover class, as the pure type of mountain big sagebrush is. Conversely, in our mapping of sagebrush, younger stands that resulted from burning in the Foothills Fire may not have been correctly identified to the proper community type; hence more acres may have been assigned to the pure mountain big sagebrush type than what would have existed prior to the fire.

Sawtooth National Forest - Eleven vegetation types were recognized on the Sawtooth National Forest, with four structural stages or canopy cover classes represented. Table V-64 represents the current condition for sagebrush types on the Sawtooth National Forest as a percent of acres in each canopy cover class for shrubs, and compares this to estimates of the mid-range of HRV to determine if current conditions are within the historical range. Historical conditions generally represented a balance between age and structural classes, as represented by the canopy cover classes used. The total acreage of mountain big sagebrush is 518,887 acres; with 303,200 acres being represented by the pure mountain big sagebrush cover type. The mountain big sagebrush with chokecherry, serviceberry, and rose represented 167,069 acres, mountain big sagebrush with bitterbrush was 30,939 acres, and mountain big sagebrush with snowberry accounted for 17,679 acres. The majority of mountain big sagebrush acres (58 percent) are represented by the pure cover type of mountain big sagebrush, and 32 percent is mountain big sagebrush with chokecherry, serviceberry, and rose. All mountain big sagebrush types combined account for 81 percent of the total acres mapped in the non-forested types. Basin big sagebrush accounts for 1.6 percent, low sagebrush is 2.9 percent, Wyoming big sagebrush is 0.9 percent, climax aspen is 7.1 percent, mountain big sagebrush with pinyon-juniper is 1.3 percent, Wyoming big sagebrush with pinyon-juniper is only 4.9 acres total (negligible percentage) and pure stands of pinyon-juniper are 5.2 percent of the total non-forested acreage.

Table V-64 also displays the current and historical conditions as a percent of acres and the actual value of the difference between current and historical. A mathematical comparison is used to determine whether or not the current canopy covers deviate from the estimated distribution of historical. All three canopy cover classes are analyzed simultaneously to help determine whether or not the entire range of canopy covers is within the historical range.

Table V-64. Current Conditions for the Sawtooth National Forest Sagebrush Types, Expressed as a Percent of Total Acreage

Cover Type	Canopy Cover Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference from Historical	Within Historical
Mountain Big Sagebrush	0-10% 11-20% >21%	32.9 48.1 19.0	34 33 33	- 1.1% +15.1% -14.0%	Out
Mountain Big Sagebrush with Snowberry	0-10% 11-20% >21%	25.0 43.9 31.0	34 33 33	- 9.0% +10.9% - 2.0%	Out
Mountain Big Sagebrush with Bitterbrush	0-10% 11-20% >21%	11.4 35.0 53.6	34 33 33	-22.6% + 2.0% +20.6%	Out
Basin Big Sagebrush	0-10% 11-20% >21%	42.1 48.5 9.5	34 33 33	+ 8.1% +15.5% -23.5%	Out
Low Sagebrush	0-10% 11-20% >21%	35.7 57.1 7.3	>90 <10 0	-54.3% +47.1% + 7.3%	Out
Wyoming Big Sagebrush	0-10% 11-20% >21%	55.5 41.0 3.4	34 33 33	+21.5% + 8.0% -29.6%	Out

In the mountain big sagebrush cover type, there is currently an overabundance of acreage in the medium canopy cover class (11-20 percent) and a paucity of acres in the high canopy cover class (>21 percent), when compared with historical estimates. A similar situation exists for the mountain big sagebrush with snowberry, although there are more acres lacking in the low (0-10 percent) canopy cover class. However, this situation does not hold true for other mountain big sagebrush communities. Mountain big sagebrush with chokecherry, serviceberry, and rose has an abundance in both the medium and high canopy cover classes and is lacking in the low canopy cover class; however, the variance is not that large and the range is within the historical conditions. Mountain big sagebrush with bitterbrush has a large deviance in the low and high canopy cover classes (too much high and not enough low), most likely resulting from management practices that have acted to increase canopy cover, and the lack of disturbances. Basin big sagebrush and Wyoming big sagebrush are both lacking in the high canopy closure class. Low sagebrush had too many acres in both the medium and high canopy cover classes.

Table V-65 displays that climax aspen has an abundance of acres in the small size class, yet not enough in the medium/large size class, and Table V-66 displays that pinyon-juniper has the majority of acres in the small size class, leaving a deficit of acres in the other size classes.

Table V-65. Current Conditions for the Sawtooth National Forest Climax Aspen, Expressed as a Percent of Total Acreage

Cover Type	Size Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference from Historical	Within Historical
Climax Aspen	GFSS/Saplings Small Medium/Large	35.9 60.2 3.9	40 30 30	- 4.1% +30.2% -26.1%	Out

Table V-66. Current Conditions for the Sawtooth National Forest Pinyon-Juniper, Expressed as a Percent of Total Acreage

Cover Type	Size/Canopy Classes	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference from Historical	Within Historical
Pinyon-Juniper	GFSS Saplings/All Small/All Medium/Low Canopy Medium/Moderate-High Canopies	Unknown 0.75 75.5 0.0 23.8	10 10 20 20 40	Unknown - 9.25% +55.5% -20.0% -16.2%	Out

None of the vegetation types, with the exception of mountain big sagebrush with chokecherry, serviceberry, and rose, are within historical conditions. As pointed out above, the current conditions all result from a complex interaction between past management and disturbance cycles, making it difficult to pinpoint an exact reason for the conditions and their deviations from the historical estimates. In the case of low sagebrush, mapping accuracy may have been a problem, as field reconnaissance did not reveal such a large amount of acres outside of the low canopy cover class. Until an accuracy assessment is conducted on the mapping, it is difficult to determine if the mapping adequately captured canopy covers for low sagebrush. Mapping accuracy could be a problem with the other types as well, although they generally seem to agree with field reconnaissance observations. If the low and medium classes for low sagebrush are combined, to perhaps compensate for mapping errors, low sagebrush would come much closer to meeting historical conditions.

In the pinyon-juniper vegetation classes, it was not possible to distinguish areas mapped as grasslands as to whether the habitat type is potential pinyon-juniper, sagebrush, or grasslands. These determinations would be necessary at project levels. Two other vegetation types were mapped and analyzed on the Sawtooth National Forest, the mountain big sagebrush with pinyon-juniper, and the Wyoming big sagebrush with pinyon-juniper. These types only included those areas where the pinyon-juniper canopy cover was less than 10 percent. Those areas greater than 10 percent were included as pure pinyon-juniper. These mixed types were mapped to represent those areas that may be undergoing conversion from sagebrush to pinyon-juniper. It is hard at the Forest-wide scale to differentiate exactly which acres are truly sagebrush and/or pinyon-juniper habitat types, from those that may be undergoing type conversion. We used the sagebrush with pinyon-juniper less than 10 percent canopy cover types as a proxy at the Forest-wide scale to understand how alternatives may have an effect on type conversions. True determinations of type conversions and selected management would need to be made at the project level with accurate habitat type mapping to determine what appropriate desired conditions should be. However, for modeling purposes at the Forest-wide scale, these types are used to depict successional changes and type conversions in the sagebrush/pinyon-juniper dynamic.

Total acres of pinyon-juniper mapped are 33,557. These were proportioned between those that may be successional from mountain big sagebrush and those that may be successional from Wyoming big sagebrush, based on the relative proportions of these two subspecies of sagebrush. Therefore, 0.98 percent (329 acres) of the pinyon-juniper acres are representative of the successional pathways between Wyoming big sagebrush and pinyon-juniper, and 99 percent of the pinyon-juniper acres (33,228 acres) represent the successional pathways between mountain big sagebrush and pinyon-juniper. Of the total acres within each of these successional pathways, 21 percent of the total acres in the pathway are mountain big sagebrush with pinyon-juniper (vs. 79 percent of pure pinyon-juniper), and 1.5 percent of the total acres are Wyoming big sagebrush in that pathway, vs. 98.5 percent of pure pinyon-juniper. Numbers are used to determine effects between the various alternatives.

Comparison of Current Condition with Desired Conditions by Alternative

Boise National Forest – Table V-67 compares each of the 4 cover type classes and their canopy cover classes with the DC for each alternative. Each current condition is compared to the DC, and the actual value of the difference between current canopy cover class and the DC for that canopy cover class is reported here. This difference is calculated from whichever end of the range the current conditions is closest to. For example, mountain big sagebrush low canopy cover is 69.0 percent; the DC for Alternative 2 is 35-45 percent; therefore, the difference is (69-45) = 24.0 percent. If a value was within the range of the DC, then it is labeled as “IN” in the table. Only mountain big sagebrush, when compared to the DC for Alternative 5, would currently be within DC for all three canopy cover classes. Mountain big sagebrush was also within the range for DC for the high canopy cover class for Alternatives 2 and 7. Mountain big sagebrush with chokecherry, serviceberry, and rose was within DC only for the high canopy cover in Alternative 5, mountain big sagebrush with snowberry was not within DC for any alternative, and mountain big sagebrush with bitterbrush was within DC for the high canopy closure on Alternative 2 and Alternative 5, and the low canopy closure for Alternative 6.

Table V-67. Comparison of Current Condition with DCs by Alternative for Boise National Forest

Cover Type	Canopy Cover Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Mountain Big Sagebrush	0-10% 11-20% >21%	69.0% 8.6% 22.5%	+19.0% -16.4% -2.5%	+24.0% -21.4% **IN**	+35.0% -24.4% -27.0%	+35.0% -24.4% -27.0%	**IN** **IN** **IN**	+39.0% -11.4% -7.5%	+29.0% -21.4% **IN**
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	0-10% 11-20% >21%	5.4% 88.6% 6.0%	-44.6% +63.6% -19.0%	-29.6% +48.6% -19.0%	-28.6% +55.6% -27.0%	-28.6% +55.6% -27.0%	-44.6% +63.6% **IN**	-19.6% +53.6% -24.0%	-24.6% +48.6% -14.0%
Mountain Big Sagebrush with Snowberry	0-10% 11-20% >21%	0.0% 18.8% 81.2%	-50.0% -6.2% +56.2%	-35.0% -11.2% +51.2%	-34.0% -14.2% +48.2%	-34.0% -14.2% +48.2%	-50.0% -6.2% +56.2%	-25.0% -1.2% +41.2%	-30.0% -11.2% +51.2%
Mountain Big Sagebrush with Bitterbrush	0-10% 11-20% >21%	29.7% 54.0% 16.3%	-20.3% +29.0% -8.7%	-5.3% +14.0 **IN**	-4.3% +21.0% -16.7%	-4.3% +21.0% -16.7%	-20.3% +29.0% **IN**	**IN** +19.0% -13.7%	-0.3% +14.0% -3.7%

Table V-68 shows the results of a mathematical comparison used to determine whether or not the current canopy covers deviate from the DC values. This was analyzed for all three canopy cover classes simultaneously; assisting with the determination of whether or not the entire range of canopy covers is within a desired range.

Using this analysis, mountain big sagebrush currently meets the DC for Alternative 5, and mountain big sagebrush with bitterbrush meets the DC for Alternatives 2 and 7. For the cases above in Table V-67 where one canopy cover class may have been within the DC, the other classes were too far from the range of DC for the type to be considered within range. For mountain big sagebrush with bitterbrush, none of the values are within the range of DC for Alternative 7, yet none of the canopy cover classes were far enough outside the range of DC, so the mathematical comparison displays that the differences do not deviate from the DC ranges.

Table V-68. Comparison of Current Condition with DCs by Alternative for Boise National Forest

Cover Type	Canopy Cover Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Mountain Big Sagebrush	0-10% 11-20% >21%	69.0% 8.6% 6.0%	Out	Out	Out	Out	**In**	Out	Out
Mountain Big Sage with Chokecherry, Serviceberry, Rose	0-10% 11-20% >21%	69.0% 8.6% 22.5%	Out	Out	Out	Out	Out	Out	Out
Mountain Big Sagebrush with Snowberry	0-10% 11-20% >21%	5.4% 88.6% 6.0%	Out	Out	Out	Out	Out	Out	Out
Mountain Big Sagebrush with Bitterbrush	0-10% 11-20% >21%	29.7% 54.0% 16.3%	Out	**In**	Out	Out	Out	Out	**In**

Sawtooth National Forest - The same analysis process is utilized here as was used for the Boise National Forest. Table V-69 shows that none of the vegetation types when compared to the DCs for each alternative are currently within the DC for all three canopy cover classes. Mountain big sagebrush is within the range for DC for the high canopy cover class for both Alternatives 2 and 5 and the low canopy cover class for Alternative 7. Mountain big sagebrush with chokecherry, serviceberry, and rose was within DC for both the low and the high canopy cover in Alternative 6, both the low and medium for Alternative 7, and the medium cover class for Alternative 2. Mountain big sagebrush with snowberry is within DC for the low and high canopy cover classes in Alternative 6, and mountain big sagebrush with bitterbrush was within DC for the medium canopy cover for Alternatives 2, 6, and 7. Basin big sagebrush is within DC for the low cover class in Alternative 2, and the high cover class for Alternative 5; Wyoming big sagebrush is within the DC for both the low and high canopy cover classes for Alternative 5. Low sagebrush was not within for any alternative; however, this may be a result of poor mapping accuracy for canopy cover in this type. As shown in Table V-70, climax aspen is within the DC for the GFSS/Saplings for both Alternatives 4 and 6, while pinyon-juniper (Table V-71) only fell within DC's for the medium size/moderate-high canopy cover class for Alternative 5.

Table V-69. Comparison of Current Condition with DCs by Alternative for Sawtooth National Forest Sagebrush Types

Cover Type	Canopy Cover Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Mountain Big Sagebrush	0-10%	32.9%	-17.1%	-2.1%	- 1.1%	- 1.1%	-17.1%	+2.9%	**IN**
	11-20%	48.1%	+23.1%	+8.1%	+15.1%	+15.1%	+23.1%	+13.1%	+ 8.1%
	>21%	19.0%	- 6.0%	**IN**	-14.0%	-14.0%	**IN**	-11.1%	- 1.0%
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	0-10%	25.2%	-24.8%	- 9.8%	- 8.8%	- 8.8%	-24.8%	**IN**	**IN**
	11-20%	37.0%	+12.0%	**IN**	+ 4.0%	+ 4.0%	+12.0%	+ 2.0%	**IN**
	>21%	37.8%	+12.8%	+ 7.8%	+ 4.8%	+ 4.8%	+12.8%	**IN**	+ 7.8%
Mountain Big Sagebrush with Snowberry	0-10%	25.0%	-25.0%	-10.0%	- 9.0%	- 9.0%	-25.0%	**IN**	- 5.0%
	11-20%	43.9%	+18.9%	+ 3.9%	+10.9%	+10.9%	+18.9%	+ 8.9%	+ 3.9%
	>21%	31.0%	+ 6.0%	+ 1.0%	- 2.0%	- 2.0%	+ 6.0%	**IN**	+ 1.0%
Mountain Big Sagebrush with Bitterbrush	0-10%	11.4%	-38.6%	-23.6%	+22.6%	+22.6%	-38.6%	-13.6%	-18.6%
	11-20%	35.0%	+10.0%	**IN**	+ 2.0%	+ 2.0%	+10.0%	**IN**	**IN**
	>21%	53.6%	+28.6%	+23.6%	+20.6%	+20.6%	+28.6%	+13.6%	+23.6%
Basin Big Sagebrush	0-10%	42.1%	- 7.9%	**IN**	+ 8.1%	+ 8.1%	- 7.9%	+12.1%	+ 2.1%
	11-20%	48.5%	+23.5%	+ 8.5%	+15.5%	+15.5%	+23.5%	+13.5%	+8.5%
	>21%	9.5%	-15.5%	- 5.5%	-23.5%	-23.5%	**IN**	-20.5%	-10.5%
Low Sagebrush	0-10%	35.7%	-54.3%	-54.3%	-54.3%	-54.3%	-54.3%	-54.3%	-54.3%
	11-20%	57.1%	+47.1%	+47.1%	+47.1%	+47.1%	+47.1%	+47.1%	+47.1%
	>21%	7.3%	+ 7.3%	+ 7.3%	+ 7.3%	+ 7.3%	+ 7.3%	+ 7.3%	+ 7.3%
Wyoming Big Sagebrush	0-10%	55.5%	+ 5.5%	+25.5%	+30.5%	+30.5%	**IN**	+30.5%	+25.5%
	11-20%	41.0%	+16.0%	+ 6.0%	+ 1.0%	+ 1.0%	+16.0%	+ 1.0%	+ 6.0%
	>21%	3.4%	-21.6%	+26.6%	-36.6%	-36.6%	**IN**	-36.6%	+26.6%

Table V-70. Comparison of Current Condition with DCs by Alternative for Sawtooth National Forest Climax Aspen

Cover Type	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Climax Aspen	GFSS/Saplings	35.9%	- 4.1%	- 4.1%	- 4.1%	**IN**	**- 4.1%**	**IN**	- 4.1%
	Small	60.2%	+30.2%	+25.2%	+30.2%	+25.2%	+35.2%	+25.2%	+30.2%
	Medium/Large	3.9%	-16.1%	+21.1%	-26.1%	-26.1%	**+ 6.1%**	**-26.1%**	-16.1%

Table V-71. Comparison of Current Condition with DCs by Alternative for Sawtooth National Forest Pinyon-Juniper

Cover Type	Size/Canopy Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Pinyon-Juniper	GFSS	Unknown	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Saplings/All	0.75%	-14.3%	- 9.25%	- 9.25%	- 4.25%	-14.25%	- 4.25%	-14.25%
	Small/All	75.5%	+45.5%	+50.5%	+55.5%	+55.5%	+40.5%	+55.5%	+50.5%
	Medium/Low Canopy	0.0%	-20.0%	-20.0%	-20.0%	-15.0%	-20.0%	-15.0%	-15.0%
	Medium/Moderate-High Canopies	23.8%	-1.2%	- 6.2%	-16.2%	-16.2%	**IN**	-16.2%	- 6.2%

To further analyze the current condition as compared to the DCs for each alternative, Tables V-72, V-73, and V-74 show the results of a mathematical comparison used to determine whether or not the current canopy covers deviate from the DC values. This was analyzed for the various size and canopy cover classes simultaneously; assisting with the determination of whether or not the range is within the desired range.

Table V-72. Comparison of Current Condition with DCs by Alternative for Sawtooth National Forest Sagebrush Types

Cover Type	Canopy Cover Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Mountain Big Sagebrush	0-10% 11-20% >21%	32.9% 48.1% 19.0%	Out	**In**	Out	Out	Out	Out	**In**
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	0-10% 11-20% >21%	25.2% 37.0% 37.8%	Out	**In**	**In**	**In**	Out	**In**	**In**
Mountain Big Sagebrush with Snowberry	0-10% 11-20% >21%	25.0% 43.9% 31.0%	Out	**In**	Out	Out	Out	**In**	**In**
Mountain Big Sagebrush with Bitterbrush	0-10% 11-20% >21%	11.4% 35.0% 53.6%	Out	Out	Out	Out	Out	Out	Out

Cover Type	Canopy Cover Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Basin Big Sagebrush	0-10% 11-20% >21%	42.1% 48.5% 9.5%	Out	**In**	Out	Out	Out	Out	Out
Low Sagebrush	0-10% 11-20% >21%	35.7% 57.1% 7.3%	Out	Out	Out	Out	Out	Out	Out
Wyoming Big Sagebrush	0-10% 11-20% >21%	55.5% 41.0% 3.4%	Out	Out	Out	Out	Out	Out	Out

Table V-73. Comparison of Current Condition with DCs by Alternative for Sawtooth National Forest Climax Aspen

Cover Type	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Climax Aspen	GFSS/Saplings Small Medium/Large	35.9% 60.2% 3.9%	Out	Out	Out	Out	Out	Out	Out

Table V-74. Comparison of Current Condition with DCs by Alternative for Sawtooth National Forest Pinyon-Juniper

Cover Type	Size/Canopy Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Pinyon-Juniper	GFSS Saplings/All Small/All Medium/Low Canopy Medium/Moderate-High Canopies	Unknown 0.75% 75.5% 0.0% 23.8%	Out	Out	Out	Out	Out	Out	Out

Using this analysis, mountain big sagebrush currently meets the DC for Alternatives 2 and 7; mountain big sagebrush with chokecherry, serviceberry, and rose meets the DC for Alternatives 2, 3, 4, 6, and 7; mountain big sagebrush with snowberry meets the DC for Alternatives 2, 6, and 7; and mountain big sagebrush with bitterbrush does not meet the DC for any alternative. Basin big sagebrush meets the DC for Alternative 2, and none of the current conditions meet the DC for low sagebrush, Wyoming big sagebrush, climax aspen or pinyon-juniper. As stated above, although some canopy cover classes may have been within the DC, other classes may have been too far away for the type to be within range. In other cases, none of the canopy cover classes may have been within the DC, but none of them varied far enough from the DC so they mathematically are within the range.

Summary of Current Conditions for Non-Forested Vegetation

Mountain big sagebrush with chokecherry, serviceberry, and rose is the only type with the current condition within HRV on the Sawtooth National Forest. None of the vegetation types on the Boise National Forest are currently within HRV. When comparing current condition to the DCs, Alternative 5 has mountain big sagebrush on the Boise National Forest within the DC, and Alternatives 2 and 7 for mountain big sagebrush with bitterbrush. Alternative 2 has mountain big sagebrush, mountain big sagebrush with chokecherry, serviceberry, and rose, mountain big sagebrush with snowberry, and basin big sagebrush within the DC on the Sawtooth National Forest. Also on the Sawtooth, Alternative 7 has mountain big sagebrush, mountain big sagebrush with chokecherry, serviceberry, and rose, and mountain big sagebrush with snowberry within the DC. Alternative 6 is within DC for mountain big sagebrush with chokecherry, serviceberry, and rose and mountain big sagebrush with snowberry on the Sawtooth National Forest and Alternatives 3 and 4 are within the DC for mountain big sagebrush with chokecherry, serviceberry, and rose. None of the climax aspen or pinyon-juniper are currently within historical or desired conditions ranges.

Overall, mountain big sagebrush with chokecherry, serviceberry, and rose on the Sawtooth National Forest is the only type with the current condition within both HRV and the DCs (for Alternatives 2, 3, 4, 6, and 7).

Mountain big sagebrush with bitterbrush currently has higher than historical canopy covers on the Sawtooth National Forest. Densities of Wyoming big sagebrush are much less dense than historical and there is an abundance in the 0-10 percent canopy cover class; this is indicative of the disrupted fire cycles in this type. Climax aspen has an abundance of acreage in the small class, but small amounts of acreage in the regeneration stages (G/F/S/S) and very little in the large classes. Pinyon-juniper is harder to draw conclusions about; again there is an abundance of acreage in the small class, indicating possible conversion from other types. However there is very little in the regeneration class, which contradicts that areas of other non-forested types are undergoing type conversion to pinyon-juniper. It is possible that some of these acres were picked up in the mixed classes with sagebrush and pinyon-juniper less than 10 percent canopy cover.

The current conditions of various non-forested vegetation types to current percentages size/canopy cover classes is believed to be the result of: (1) the suppression of wildfires for several decades that has resulted in a reduced fire return interval and larger wildfires, (2) insufficient post-recovery periods for understory forbs and grasses on summer wildfires, and (3) livestock grazing practices that do not allow understory plant physiological needs to be met, thus inhibiting successful regeneration and promoting competitive advantages to shrub species. Some of these vegetation types are further away from historical/desired conditions than others, making them important criteria for evaluating environmental consequences of the alternatives, regardless of the acreage within the Ecogroup that they comprise.

Other Non-Forest Types

A summary of other non-forested types not analyzed in detail is presented in Table V-75 for the three Forests.

A mid-level assessment (Hessburg et al. 1999) was conducted as part of the ICBEMP. Characterizations were made of historical and current vegetation group structure by randomly sampling subwatersheds. Some comparisons are made between trends in the Ecogroup and those found in the ICBEMP study (ICBEMP 2000a). Available information on these types indicates the following:

- The Ecogroup Forests have not seen the increases of exotic or annual grasses to the extent that other areas within the ICBEMP have. While most of these changes are occurring in the drier cover types, the presence of exotic species has increased noticeably across all three Forests (see *Non-native Plants* section in this chapter), and the risks for new invasions has increased with the close proximity of infestations off National Forest land.

- The native perennial grass cover types show similar trends as the grassland vegetation group at the broader scale of the ICBEMP. These cover types appear to be less than historical ranges. However, there has been a recent increase in herbaceous cover types due to recent wildfire activity. The exact cover type assignments for these burned areas have not been determined.

- The influence of agriculture or disturbed lands on the Forests is significantly less than off the Forests, but the conditions off-Forest may increase the importance of certain cover types on National Forest System lands.

- The current extent of introduced perennial grasses is notable when compared to the extent of historical shrub and native perennial grass communities.

- The proportion of mountain big sagebrush appears to be greater than historical expectations when compared to amount of perennial grass slopes or perennial grass montane communities.

- The percent of burned shrub and burned herbaceous is significant, given the large block size, extent, and the lack of mosaic pattern. Most of these types are associated with four large blocks on the Boise and Payette Forests.

Table V-75. Woodland, Shrubland, and Grassland Cover Types by Forest and Ecogroup

Vegetation Cover Types	Percent of Non-forested Boise NF	Percent of Non-forested Payette NF	Percent of Non-forested Sawtooth NF	Percent of Ecogroup Non-forested Cover Types
Woodlands				
Mountain Mahogany	T*	-	T	T
Shrublands				
Montane Shrub	23	9	10	15
Grasslands & Herblands				
Alpine Herb	T	<1	1	T
Annual Grass/Forbs	T	T	T	T
Burned Herbaceous	13	25	<1	10
Dry Meadows	1	1	<1	<1
Perennial (introduced) Grass	3	1	0.4	2
Perennial Grass Montane	1	13	1	3
Perennial Grass Slope	3	15	1	5
Tall Forb Meadow	1	2	2	2
Wet Meadow	1	1	<1	1

*T refers to trace amounts

The shift from historic to current percentages of cover type extent on the three Forests is believed to be the result of the following influences, in descending order of importance:

- The suppression of wildfires for several decades, which contributed to a reduced fire return interval. This has had a significant influence on the extent of non-forested vegetative cover types in the Ecogroup. As a result, forest cover types such as Douglas fir, ponderosa pine, and subalpine fir have replaced areas that were historically grasslands and shrublands; sagebrush shrublands have replaced grassland cover types with the lack of fire disturbance; and, more recently, burned herbaceous and shrublands have replaced large blocks of forested cover types and sagebrush shrublands.

- Historic grazing has contributed to changes of grassland, shrubland, and woodland cover types.

- The seeding of introduced grasses for site stabilization or forage has contributed to cover type changes within the perennial grass slopes and sagebrush types.

The impact of introduced grasses in the Columbia River drainage is not only highly site specific, but also dependent upon the management conditions imposed (Harrison et al. 1996). Destruction of sagebrush-grass vegetation by fire, heavy grazing, or cultivation has allowed these systems to convert to annuals, particularly cheatgrass, *Bromus tectorum* (Blaisdell et al. 1982). Once established, cheatgrass is a serious fire hazard and allows invasion of other weeds. Cheatgrass invasion has created continuous fuels in the understory and facilitates firespread (Knick and Rotenberry 1999). Cheatgrass cures earlier than native grasses, also increasing the length of the fire season. The larger and more frequent fires in this disturbance regime have either eliminated or widely dispersed the existing seed sources of shrub species (Knick and Rotenberry 1997). The invasion of cheatgrass is an example of how ecosystem-wide alterations can occur with the addition of only one exotic species (Billings 1990).

Properly Functioning Condition - As part of Forest Plan revision, the Ecogroup Forests developed criteria for, and conducted PFC assessments for 11 different non-forested subject areas in order to better understand the current condition of resources within the Ecogroup and to validate results from the Regional PFC assessment. Selected results of the non-forested vegetative subject areas are summarized and displayed in Table V-76 for those non-forested types not analyzed and modeled in detail. The perennial grass slopes subject area was typically at risk because of lack of ground cover, invasion of exotic grasses and noxious weeds, or seedings of introduced perennials for the purpose of watershed rehabilitation or forage improvement.

Table V-76. Properly Functioning Condition Assessment by Non-forested Subject Area For Management Areas of the Ecogroup

PFC Subject Area	Regional PFC Risk Rating	Mgmt. Areas At PFC	Mgmt. Areas At Low Risk	Mgmt. Areas At Moderate Risk	Mgmt. Areas At High Risk	Number of Mgmt Areas Assessed*
Alpine Meadow	Low	3	10	3	3	19
Montane Shrub	Low	19	14	3		36
Perennial Grass Montane	High	5	3	5		13
Perennial Grass Slopes	High	5	12	5	4	26

*Based on district identification of significant vegetative subject areas within the management area.

Ecogroup Current Condition Of Riparian Vegetation

Community typing represents existing community structure and composition, with no indication of successional status or relationship to temporal setting (Padgett et al. 1989). Community typing is used when ecological conditions or disturbance processes do not allow the vegetation to express a well-defined climax plant community. Riparian area vegetative communities are prime examples, because vegetation is often influenced by yearly and seasonal changes. A common characteristic of vegetation communities in riparian zones involves a gradual movement or swapping of community types. As stream channels move about within a given complex, or when a meander breaks and forms a stream channel in a new area, plant community types gradually develop to fit these newly created environments (Winward 2000). Vegetative communities created by these processes are recognizable and have been described. Although no comprehensive riparian classifications or community type descriptions exist for the three Forests, several classifications have been developed for surrounding areas (Youngblood et al. 1985, Padgett et al. 1989, Hall and Hansen 1997) and can be used for the Ecogroup area.

Table V-77. Percentage of Riparian Vegetation Life-form Groups by Forest and Ecogroup

Riparian Vegetation Life-form Group	Boise NF Percentages	Payette NF Percentages	Sawtooth NF Percentages	Ecogroup Percentages
Forested (Riverine)	25	40	27	28
Deciduous Tree	6	8	2	5
Shrub	60	43	65	59
Herbaceous	7	8	4	6
Marsh or Wetlands	3	1	2	2
Mud Flat	<1	0	0	<1

Community type descriptions are detailed and are more appropriate for site-specific applications, as described in the *Intermountain Region Integrated Riparian Evaluation Guide* (USDA Forest Service 1992). However, these community types can be aggregated into broader life form categories and complexes that have application at the Forest level. The extent to which these occupy the landscape can be valuable for evaluating long-term hydrologic change and vegetative response. An analysis on the Utah LANDSAT classification (Edwards and Homer 1996) to identify riparian life-form cover types identified the current breakdown of the riparian life-form groups by Forest, as shown in Table V-77.

Forested Riparian Vegetation Components

Coniferous riparian areas are often difficult to distinguish with remotely sensed imagery; hence no distinct classification of forested riparian types is available at this time. Youngblood et al. (1985) stated that these community types in their areas likely represent successional stages within described forested communities. For this reason, Padgett et al. (1989) recommended consulting available forest habitat type classifications for additional information. The broad-scale analysis of Properly Functioning Condition in different management areas may lack the specificity of describing ecosystem components of forested riparian areas. Given the lack of information on riparian potential vegetation and specific inventories of existing conditions in riparian areas, it is difficult to make specific comparisons between the existing condition and historic/desired conditions regarding some forested riparian components, such as species composition, other than assuming the same conditions than exist for forested PVGs also exist in forested riparian areas.

The forested or riverine riparian habitat is further broken down into percentage of acres in Riparian Conservation Areas (RCAs) within each associated upland PVG (Table V-78). These percentages were based on classifications from LANDSAT imagery provided by the University of Montana (Redmond et al. 1998). Riparian vegetation within RCAs is a smaller percentage and is estimated to be 2-4 percent of all Ecogroup acres. This would include all riparian community types, not only the forested or riverine communities.

Table V-78. Percent of Acres within PVGs Comprised of RCAs

Percent of Acres in RCAs										
National Forest	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10	PVG 11
Boise	19.3	20.5	16.4	17.8	14.1	13.8	7.8	N/A	7.8	6.9
Sawtooth	17.6	22.5	20.1	18.8	N/A	N/A	14.3	N/A	17.5	9.5
Payette	16.4	17.1	35.5	9.3	16.5	14.1	7.9	21.1	20.2	3.8

Current Conditions for Forested Riparian Vegetation

Large trees within forested riparian areas make up an important functional component. Large trees provide valuable habitat for many riparian-dependent terrestrial species, and they provide shade and aquatic habitat. The ICBEMP (2000a) found a general trend in the interior Columbia Basin toward reduction in large riparian trees, primarily through timber harvest. Furthermore, the extent of late and early seral structural stages has decreased, primarily because of fire exclusion and the harvest of large trees (ICBEMP 2000a).

Large-diameter conifers also provide large woody debris in streams necessary to sustain rearing habitat for fish and other aquatic organisms (Franklin et al. 1981, Bisson et al. 1987). In many aquatic ecosystems, inputs of large woody material from riparian and upslope areas physically and biologically influence aquatic habitats (Harmon et al. 1986, Maser and Sedell 1994). Large woody material is important to most stream habitats in forested areas, regardless of stream size (Sedell et al. 1984). Large woody material can influence channel morphology by affecting longitudinal profile, pool formation, channel pattern, channel position, and channel geometry (Bisson et al. 1987). Large woody material performs many environmental functions important to fish and aquatic invertebrates. In order to describe the current condition of this important component, Table V-79 describes the large tree component of coniferous riparian types.

Table V-79. Percent of Acres Classified as Large Tree Size Class in RCAs by PVG

Large Tree Size Class in RCAs										
National Forest	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10*	PVG 11
Boise	11.3	13.5	13.9	12.9	19.4	20.9	8.0	N/A	8.0	9.2
Sawtooth	9.6	17.1	14.7	13.8	N/A	N/A	17.8	N/A	25.1	8.0
Payette	19.7	20.2	23.0	16.2	24.1	26.3	12.8	12.3	36.2	6.2

*Medium trees for PVG 10

Comparison of Current Condition with Historical Estimates

Size Class - As there is no riparian classification for the Ecogroup that describes the potential or climax communities, it is difficult to assess what historic conditions and desired conditions would be for the forested riparian areas. This assessment needs to be determined at a project-level scale. However, Riparian Conservation Areas (RCAs) also contain upland vegetation; they are broader than just the riparian zones. Those portions of an RCA that are not riparian (i.e.

upland) would have the same HRV and DCs as described for the upland PVG groups. The riparian portion of the RCA would most closely approximate seral stages of the PVG. It can be assumed then that the HRV and DC for the large tree component would generally at least equal, if not exceed, that for the adjacent PVG, as productivity is generally higher in riparian areas. Table V-80 compares the RCA acres classified as large trees to the mean of the HRVs presented in Table V-81. A minus sign indicates the current condition is below the HRV, and a plus sign represents the values as being above the HRV. Those entries in bold have differences less than 5 percent, indicating they are not far from the HRV.

Table V-80. Differences between Large Tree Size Class in RCAs to HRV by Forest and PVG

Large Tree Comparison to HRV in RCAs										
National Forest	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8/9	PVG 10*	PVG 11
Boise	-79.7	-66.5	-27.1	-21.1	-64.6	-35.1	-13.0	N/A	+14.2	-17.8
Sawtooth	-81.4	-62.9	-26.3	-20.2	N/A	N/A	**- 3.2**	N/A	+ 5.1	-19.0
Payette	-71.3	-59.8	-18.0	-17.8	-59.9	-29.7	- 8.2	- 8.7	+16.2	-20.8

*Medium tree in PVG 10

It is evident from these data that the large tree component is lacking in RCAs. Only PVG 10 exceeds the mean of the HRV. PVG 7 on the Sawtooth and Payette, PVG 8/9 on the Payette, and PVG 10 on the Sawtooth have small variances from the HRV. The rest of the PVGs have fairly large to very large variances.

Canopy Cover - A similar comparison to HRV for canopy closure is also conducted for the forested vegetation acres in RCAs. The analysis examined, for total large trees, the canopy closure distribution compared to historical estimates.

Payette National Forest – The canopy cover comparison to HRV is displayed in Table V-81 for the Payette National Forest.

Table V-81. Current Conditions for Large Tree Canopy Closure Class on the Payette National Forest RCAs, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low	46.5	100	-53.5%	Out
	Moderate	44.1	0	+44.1%	
	High	9.4	0	+9.4%	
PVG 2	Low	34.2	85.0	-50.8%	Out
	Moderate	38.2	15.0	+23.2%	
	High	27.6	0	+27.6%	

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 3	Low Moderate High	3.5 53.3 43.2	15.0 85.0 0	-11.5% -31.7% +43.2%	Out
PVG 4	Low Moderate High	6.6 55.6 37.8	3.0 97.0 0	+ 3.6% -41.4% +37.8%	Out
PVG 5	Low Moderate High	19.4 46.7 33.9	35.0 65.0 0	-15.6% -18.3% +33.9%	Out
PVG 6	Low Moderate High	18.9 35.0 46.1	0 100 0	+18.9% -65.0% +46.1%	Out
PVG 7	Low Moderate High	9.9 56.0 34.2	3.0 97.0 0	+ 6.9% -41.0% +34.2%	Out
PVG 8/9	Low Moderate High	5.6 54.5 39.9	0 60.0 40.0	+ 5.6% - 5.5% - 0.1%	**In**
*PVG 10	Low Moderate High	4.4 71.1 24.6	0 90.0 10.0	+ 4.4% -18.9% +14.6%	Out
PVG 11	Low Moderate High	25.2 42.5 32.4	7.0 93.0 0	+18.2% -50.5% +32.4%	Out

*PVG 10 medium tree

Only PVG 8/9 is within the historical estimate. All of the other PVGs generally have more acres in the denser canopy closure classes than would be expected when compared to the HRV. PVGs 4, 6, 7, 10, and 11 also have additional acres in the low canopy closure class.

Boise National Forest - The canopy cover comparison to HRV is displayed in Table V-82 for the Boise National Forest.

Table V-82. Current Conditions for Large Tree Canopy Closure Class on the Boise National Forest RCAs, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	26.7 55.4 17.9	100 0 0	-73.3% +55.5% +17.9%	Out
PVG 2	Low Moderate High	22.0 52.2 25.8	85.0 15.0 0	-63.0% +37.2% +25.8%	Out

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 3	Low Moderate High	9.9 59.2 30.9	15.0 85.0 0	- 5.1% -25.8% +30.9%	Out
PVG 4	Low Moderate High	10.9 69.8 19.4	3.0 97.0 0	+ 7.9% -27.2% +19.4%	Out
PVG 5	Low Moderate High	3.1 62.4 34.6	35.0 65.0 0	-31.9% - 2.6% +34.6%	Out
PVG 6	Low Moderate High	1.9 56.4 41.7	0 100 0	+ 1.9% -43.6% +41.7%	Out
PVG 7	Low Moderate High	8.1 72.1 19.8	3.0 97.0 0	+ 5.1% -24.9% +19.8%	Out
PVG 8/9	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
*PVG 10	Low Moderate High	8.6 82.7 8.9	0 90.0 10.0	+ 8.6% - 7.3% + 8.9%	Out
PVG 11	Low Moderate High	24.6 71.3 4.2	7.0 93.0 0	+17.6% -21.7% + 4.2%	Out

*PVG 10 medium tree

None of the PVGs are within the historical estimates. All of the PVGs generally have more acres in the denser canopy closure classes than would be expected when compared to the HRV. PVGs 4, 6, 7, 10, and 11 also have additional acres in the low canopy closure class.

Sawtooth National Forest - The canopy cover comparison to HRV is displayed in Table V-83 for the Sawtooth National Forest.

Table V-83. Current Conditions for Large Tree Canopy Closure Class on the Sawtooth National Forest RCAs, Compared with Historical Estimates, Expressed as a Percent of Total Acreage

PVG	Canopy Closure Classes of Large Trees	Current Condition (Percent of Acres)	Historical Estimate (Percent of Acres)	Difference with Historical	Within Historical
PVG 1	Low Moderate High	17.3 61.5 21.3	100 0 0	-82.7% +61.5% +21.3%	Out
PVG 2	Low Moderate High	15.9 69.9 14.2	85.0 15.0 0	-69.1% +54.9% +14.2%	Out
PVG 3	Low Moderate High	10.7 73.1 16.2	15.0 85.0 0	- 4.3% -11.9% +16.2%	Out
PVG 4	Low Moderate High	17.2 61.1 21.7	3.0 97.0 0	+14.2% -35.9% +21.7%	Out
PVG 5	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 6	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
PVG 7	Low Moderate High	10.9 68.1 21.0	3.0 97.0 0	+ 7.9% -28.9% +21.0%	Out
PVG 8/9	Low Moderate High	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A
*PVG 10	Low Moderate High	5.6 88.6 5.8	0 90.0 10.0	+ 5.6% - 1.4% + 4.2%	**In**
PVG 11	Low Moderate High	10.9 74.5 14.6	7.0 93.0 0	+ 3.9% -18.5% +14.6%	Out

*PVG 10 medium tree

Only PVG 10 is within the historical estimate. All of the other PVGs generally have more acres in the denser canopy closure classes than would be expected when compared to the HRV. PVGs 4, 7, and 11 also have additional acres in the low canopy closure class.

Comparison of Current Conditions with Desired Conditions

Size Class, Payette National Forest - Table V-84 represents the amount of variation from the desired condition for each alternative for acres inside of RCAs for the large (medium for PVG 10) size class. The current conditions for tree size class meet the desired conditions only for PVG 3 in Alternative 1B. Also highlighted in bold are other current condition values that are close to the DC (less than 5 percent difference). All of these values either fall within Alternative

1B or Alternative 5, indicating that the current condition is closest to the DCs for these alternatives within RCAs. All other PVGs are below the desired condition except for PVG 10 (medium trees), which is above the DC. PVGs 3 and 6 in Alternative 5, and PVG 7 in Alternative 1B, are above the DC. The largest deviations from the DC are for PVGs 1, 2, and 5.

Table V-84. Current Conditions for Tree Size Class on the Payette National Forest in RCAs, Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	Large	19.7%	-27.3%	-49.3%	-71.3%	-71.3%	**- 4.3%**	-61.3%	-51.3%
PVG 2	Large	20.2%	-38.8%	-50.8%	-59.8%	-59.8%	- 9.8%	-55.8%	-36.8%
PVG 3	Large	23.0%	**0%**	-9.0%	-18.0%	-18.0%	**+3.0%**	-29.0%	-28.0%
PVG 4	Large	16.2%	**- 3.8%**	-10.8%	-17.8%	-17.8%	**- 3.8%**	-16.8%	-16.8%
PVG 5	Large	24.1%	-41.9%	-50.9%	-59.9%	-59.9%	- 8.9%	-55.9%	-37.9%
PVG 6	Large	26.3%	**- 1.7%**	-15.7%	-29.7%	-29.7%	+ 6.3%	-23.7%	-12.7%
PVG 7	Large	12.8%	**+ 2.8%**	- 7.2%	- 8.2%	- 8.2%	- 7.2%	- 7.2%	- 7.2%
PVG 8/9	Large	12.3%	- 5.7%	- 7.7%	- 8.7%	- 8.7%	- 7.7%	- 8.7%	- 8.7%
PVG 10	*Medium	36.2%	+25.2%	+16.2%	+16.2%	+16.2%	+25.2%	+16.2%	+16.2%
PVG 11	Large	6.2%	- 7.8%	-14.8%	-20.8%	-20.8%	-13.8%	-19.8%	-19.8%

*PVG 10 refers to Medium Tree Size Class

Size Class, Boise National Forest - Table V-85 represents the amount of variation from the desired condition for each alternative for acres inside of RCAs for the large (medium for PVG 10) size class. The current conditions do not meet the DC for tree size class in any Alternative. Also highlighted in bold are other current condition values that are close to the DC (less than 5 percent difference). All of these values either fall within Alternative 1B or Alternative 5, indicating that the current condition is closest to the DCs for these alternatives within RCAs. All other PVGs are below the desired condition, except for PVG 10 (medium trees), which is above the DC, PVG 6 in Alternative 5, and PVG 7 in Alternative 1B, which are also above the DC. The largest deviations from the DC are for PVGs 1, 2, and 5.

Table V-85. Current Conditions for Tree Size Class on the Boise National Forest in RCAs, Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	Large	11.3%	-35.7%	-57.7%	-79.7%	-79.7%	-12.7%	-69.7%	-57.7%
PVG 2	Large	13.5%	-45.5%	-57.5%	-66.5%	-66.5%	-16.5%	-62.5%	-38.5%
PVG 3	Large	13.9%	- 9.1%	-18.1%	-27.1%	-27.1%	- 6.1%	-27.1%	-17.1%
PVG 4	Large	12.9%	- 7.1%	-14.1%	-21.1%	-21.1%	- 7.1%	-17.1%	-16.1%
PVG 5	Large	19.4%	-46.6%	-55.6%	-64.6%	-64.6%	-13.6%	-56.6%	-31.6%
PVG 6	Large	20.9%	- 7.1%	-21.1%	-35.1%	-35.1%	**+ 0.9%**	-25.1%	-12.1%
PVG 7	Large	8.0%	**+ 2.0%**	-12.0%	-13.0%	-13.0%	-12.0%	-38.0%	-12.0%
PVG 8/9	Large	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10	*Medium	34.2%	+23.2%	+14.2%	+14.2%	+14.2%	+14.2%	+14.2%	+14.2%
PVG 11	Large	9.2%	**- 4.8%**	-11.8%	-17.8%	-17.8%	-10.8%	-17.8%	-17.8%

*PVG 10 refers to Medium Tree Size Class

Size Class, Sawtooth National Forest - Table V-86 represents the amount of variation from the desired condition for each alternative for acres inside of RCAs for the large (medium for PVG 10) size class. The current conditions do not meet the DC for tree size class in any Alternative. Also highlighted in bold are other current condition values that are close to the DC (less than 5 percent difference). All of these values are for PVG 10, in every alternative except 1B, indicating that the current condition is closest to the DCs for these alternatives within RCAs. All other PVGs are below the desired condition. The largest deviations from the DC are for PVGs 1 and 2.

Table V-86. Current Conditions for Tree Size Class on the Sawtooth National Forest in RCAs, Compared with Desired Conditions by Alternative, Expressed as a Percent of Total Acreage

PVG	Size Classes	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	Large	9.6%	-37.4%	-59.4%	-81.4%	-81.4%	-14.4%	-71.4%	-78.4%
PVG 2	Large	17.1%	-41.9%	-53.9%	-62.9%	-62.9%	-12.9%	-65.9%	-51.9%
PVG 3	Large	14.7%	- 8.3%	-17.3%	-26.3%	-26.3%	- 5.3%	-33.3%	-29.3%
PVG 4	Large	13.8%	- 6.2%	-13.2%	-20.2%	-20.2%	- 6.2%	-17.2%	-17.2%
PVG 5	Large	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6	Large	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	Large	17.8%	- 7.8%	-22.0%	-32.0%	-32.0%	-22.0%	-22.0%	-22.0%
PVG 8/9	Large	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10	*Medium	25.1%	+14.1%	**+ 5.1%**	**+ 5.1%**	**+ 5.1%**	**+ 5.1%**	**+ 5.1%**	**+ 5.1%**
PVG 11	Large	8.0%	- 6.0%	-13.0%	-19.0%	-19.0%	-12.0%	-18.0%	-18.0%

*PVG 10 refers to Medium Tree Size Class

Canopy Closure, Payette National Forest - Table V-87 represents the amount of variation from the desired condition for each alternative for acres inside of RCAs for the canopy closure classes. A mathematical comparison is used to determine whether or not the current canopy closures deviate from the DC values. This was analyzed for the canopy closure classes simultaneously; assisting with the determination of whether or not the range is within a desired range.

Table V-87. Comparison Results for Canopy Closure Class on the Payette National Forest Within RCAs Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size/Canopy Closure Classe s	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Large Low Large Mod. Large High	9.2% 8.7% 1.9%	Out	Out	Out	Out	Out	Out	Out
PVG 2	Large Low Large Mod. Large High	6.9% 7.7% 5.7%	Out	Out	Out	Out	Out	Out	Out
PVG 3	Large Low Large Mod. Large High	0.8% 12.2% 9.9%	Out	Out	Out	Out	**In**	Out	Out
PVG 4	Large Low Large Mod. Large High	1.1% 9.0% 6.1%	Out	Out	Out	Out	Out	**In**	**In**
PVG 5	Large Low Large Mod. Large High	4.7% 11.2% 8.2%	Out	Out	Out	Out	Out	Out	Out
PVG 6	Large Low Large Mod. Large High	5.0% 9.2% 12.1%	Out	Out	Out	Out	Out	Out	Out
PVG 7	Large Low Large Mod. Large High	1.3% 7.2% 4.4%	**In**	Out	Out	Out	Out	Out	Out
PVG 8/9	Large Low Large Mod. Large High	0.7% 6.7% 4.9%	**In**	**In**	**In**	**In**	**In**	**In**	**In**
PVG 10*	Medium Low Medium Mod. Medium High	1.6% 25.8% 8.9%	Out	Out	Out	Out	Out	Out	Out
PVG 11	Large Low Large Mod. Large High	1.6% 2.6% 2.0%	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

PVG 8/9 in all Alternatives is within the DCs. PVG 7 is within DC in Alternative 1B, PVG 3 in Alternative 5, and PVG 4 in Alternatives 6 and 7. None of the other PVGs are within the DC for other Alternatives.

Canopy Closure, Boise National Forest - Table V-88 represents the amount of variation from the desired condition for each alternative for acres inside of RCAs for the canopy closure classes. A mathematical comparison is used to determine whether or not the current canopy closures deviate from the DC values. This was tested analyzed for the canopy closure classes simultaneously; assisting with the determination of whether or not the range is within a desired range.

Table V-88. Comparison Results for Canopy Closure Class on the Boise National Forest Within RCAs Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size/Canopy Closure Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Large Low Large Mod. Large High	3.0% 6.2% 2.0%	Out	Out	Out	Out	Out	Out	Out
PVG 2	Large Low Large Mod. Large High	3.0% 7.0% 3.5%	Out	Out	Out	Out	Out	Out	Out
PVG 3	Large Low Large Mod. Large High	1.4% 8.2% 4.3%	Out	Out	Out	Out	Out	Out	Out
PVG 4	Large Low Large Mod. Large High	1.4% 9.0% 2.5%	Out	Out	Out	Out	Out	Out	Out
PVG 5	Large Low Large Mod. Large High	0.6% 12.1% 6.7%	Out	Out	Out	Out	**In**	Out	Out
PVG 6	Large Low Large Mod. Large High	0.4% 11.8% 8.7%	Out	Out	Out	Out	**In**	Out	Out
PVG 7	Large Low Large Mod. Large High	0.7% 5.8% 1.6%	**In**	Out	Out	Out	Out	Out	Out
PVG 8/9	Large Low Large Mod. Large High	0.7% 6.7% 4.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10*	Medium Low Medium Mod. Medium High	2.9% 28.2% 3.0%	Out	**In**	Out	Out	Out	Out	Out
PVG 11	Large Low Large Mod. Large High	2.3% 6.6% 0.4%	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

PVGs 5 and 6 are within the DC for Alternative 5, PVG 7 for Alternative 1B, and PVG 10 for Alternative 2. None of the other PVGs are within the DC for other Alternatives.

Canopy Closure, Sawtooth National Forest - Table V-89 represents the amount of variation from the desired condition for each alternative for acres inside of RCAs for the canopy closure classes. A mathematical comparison is used to determine whether or not the current canopy closures deviate from the DC values. This was analyzed for the canopy closure classes simultaneously; assisting with the determination of whether or not the range is within a desired range.

Table V-89. Comparison Results for Canopy Closure Class on the Sawtooth National Forest Within RCAs Comparing Current Conditions with Desired Conditions by Alternative

PVG	Size/Canopy Closure Classes	Current	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Large Low Large Mod. Large High	1.7% 5.9% 2.0%	Out	Out	Out	Out	Out	Out	Out
PVG 2	Large Low Large Mod. Large High	2.7% 12.0% 2.4%	Out	Out	Out	Out	Out	Out	Out
PVG 3	Large Low Large Mod. Large High	1.6% 10.7% 2.4%	Out	Out	Out	Out	Out	Out	Out
PVG 4	Large Low Large Mod. Large High	2.4% 8.5% 3.0%	Out	Out	Out	Out	Out	Out	Out
PVG 5	Large Low Large Mod. Large High	0.6% 12.1% 6.7%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6	Large Low Large Mod. Large High	0.4% 11.8% 8.7%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	Large Low Large Mod. Large High	1.9% 12.1% 3.7%	**In**	**In**	**In**	**In**	**In**	**In**	**In**
PVG 8/9	Large Low Large Mod. Large High	0.7% 6.7% 4.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10*	Medium Low Medium Mod. Medium High	1.4% 22.2% 1.5%	Out	**In**	**In**	**In**	Out	**In**	Out
PVG 11	Large Low Large Mod. Large High	0.9% 5.9% 1.2%	Out	Out	Out	Out	Out	Out	Out

*PVG 10 refers to Medium Tree Size Class

PVG 7 is within the DC for all Alternatives. PVG 10 is also within the DC for Alternatives 2, 3, 4, and 6. None of the other PVGs are within the DC for other Alternatives.

Summary of Current Conditions for Forested Riparian Vegetation

Forested Riparian current condition numbers can be attributed to several factors. One may be the inherent quality of the data. As the size classes of the RCAs were derived from image classification of LANDSAT data, there is some inaccuracy compared with ground-based sampling procedures. For tree size classes, the accuracy of the different classifications varied from 43 to 66 percent as being a perfect match (compared with ground inventory plots) and from 72 to 89 percent as being an "acceptable" match (Redmond et al. 1998). It is possible, therefore, that large trees in RCAs could have been underestimated. However, as stated above for forested vegetation, management activities have also acted to reduce the large tree component in coniferous forests. In many harvested areas, stand densities and species composition have been substantially altered, generally resulting in a reduction of large-sized, high-value tree species. Combining this effect with fire exclusion has resulted in stands developing uncharacteristically high levels of tree density, fuel loading, and climax species. Roads in riparian areas have also led to lower snag and downed wood levels in portions of riparian areas because of dead tree removal for fuelwood or by timber harvesting.

Generally, the results show similar current conditions in RCAs as for the forested vegetation across the three Forests. None of the PVGs in RCAs meet the HRV in both components (size and canopy). For the DCs, on the Payette National Forest PVG 3 in Alternative 5 and PVG 7 in Alternative 1B meet the DC for both components. It should be noted that PVG 3 has a very low total acreage on the Payette National Forest. PVG 6 in Alternative 5 and PVG 7 in Alternative 1B meet the DC for both components on the Boise National Forest, and PVG 10 in Alternatives 2, 3, 4, and 6 on the Sawtooth National Forest.

PVG 10 on the Sawtooth National Forest meets both the HRV and the DC for size and canopy closure (DC is for Alternatives 2, 3, 4, and 6). PVG 8/9 on the Payette National Forest meets both the HRV and DC for canopy closure only. None of the other types meet both the HRV and DC for both size and canopy closure.

Current Condition for Deciduous Riparian Vegetation

Deciduous riparian cover types include deciduous trees, willows, non-willow shrubs, forbs, and graminoid (grass) species. Major riparian plant species found on the three National Forests within the Ecogroup are shown in Table V-90.

Table V-90. Major Riparian Deciduous Plant Species in the Ecogroup

Common Name	Scientific Name
Narrowleafed cottonwood	*Populus angustifolia*
Quaking aspen	*Populus tremuloides*
Thinleaf alder	*Alnus incana*
Redosier dogwood	*Cornus sericea*
Bog birch	*Betula glandulosa*
River birch	*Betula occidentalis*
Shrubby cinquefoil	*Potentilla fruticosa*
Northern black currant	*Ribes hudsonianum*
Bebb willow	*Salix bebbiana*

Common Name	Scientific Name
Booth willow	*Salix boothii*
Drummond willow	*Salix drummondia*
Sandbar or Coyote willow	*Salix exigua*
Geyer willow	*Salix geyeriana*
Longleaf willow	*Salix lasiandra*
Lemmon willow	*Salix lemmonii*
Yellow willow	*Salix lutea*
Planeleaf willow	*Salix planifolia*
Wolfs willow	*Salix wolfii*
Bentgrass	*Agrostis spp.*
Water sedge	*Carex aquatilis*
Beaked sedge	*Carex rostrata*
Baltic rush	*Juncus balticus*
Fowl bluegrass	*Poa palustris*
Tufted hairgrass	*Deschampsia cespitosa*
Bluejoint	*Calamagrostis canadensis*
Meadow horsetail	*Equisetum arvense*
Marsh marigold	*Caltha leptosepala*
Water buttercup	*Ranunculus aquatilis*
Mountain bluebell	*Mertensia ciliata.*
Goldenrod	*Solidago canadensis*

Community typing represents existing structure and composition, with no indication of successional status or relationship to temporal setting (Padgett et al. 1989). As stated in the Forested Riparian discussion, above, several classifications have been developed for surrounding areas (Hall and Hansen 1997, Youngblood et al. 1985, Padgett et al. 1989), which can be used for the Ecogroup area. Community type descriptions are detailed and are more appropriate for site-specific applications, as described in both the 1992 *Intermountain Region Integrated Riparian Evaluation Guide* (USDA Forest Service 1992) and *Monitoring the Vegetation Resources in Riparian Areas* (Winward 2000). These community types can be aggregated into broader life-form categories and complexes that have application at the Forest level.

Under natural conditions, riparian plant communities have a high degree of structural and compositional diversity, reflecting the history of past disturbances such as flood, fire, wind, grazing, plant disease, and insect outbreaks (Gregory et al. 1991). Historically, floods and fires dominated disturbance regimes along riparian areas, with some grazing by native ungulates. The ICBEMP (2000a) found that across the entire interior Columbia Basin the extent of riparian and wetland vegetation has declined in non-forested areas, while it has increased in forested areas. This increase was attributed to fire exclusion, which allowed valley bottom and adjacent side slope vegetation to develop in the absence of disturbance. Blaisdell et al. (1982) state that condition and trend of sagebrush-grass ranges cannot be adequately evaluated without an examination of included riparian and aquatic areas, which may be particularly sensitive indicators of what is happening as a whole. Riparian areas within the sagebrush ecosystem are particularly susceptible to livestock concentrations and grazing damage (Berry 1979). Defoliation, soil compaction, and floodplain water table subsidence, due to channel widening or downcutting, have resulted in loss of densely rooted sedges and rushes, as well as willows, cottonwoods, and other woody species (Berry 1979, Kovalchik and Elmore 1992). Natural recovery of native riparian vegetation once occurring along the margins of the riparian area may be extremely slow, even with reductions in livestock grazing because of deterioration in physical conditions of the stream during the last 150 years, dominance of exotic annuals within the riparian area, and loss of native seed sources (Clary et al. 1996).

Riparian vegetation was evaluated as part of the Properly Functioning Condition assessment previously described. Riparian-wetland areas achieve proper functioning condition when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows. Proper functioning condition may represent a minimum acceptable condition; management objectives might require vegetation composition, cover, or structures that are more representative of advanced seral states (ICBEMP 2000a). In general, riparian vegetation was at risk due to loss and lack of woody vegetation composition and structure, invasion of noxious weeds, site conversion to drier vegetation, and repeated physiological stress to individual plants from grazing.

As part of the Forest Plan revision process, the Ecogroup Forests developed criteria for and conducted PFC assessments to identify the current condition of riparian vegetation within the Ecogroup and to validate results from the Regional assessment. The assessments were initially conducted at the landscape scale, looking at subbasins or groups of subbasins, and then the information was "stepped down" to the management area scale. District specialists familiar with the assessment areas evaluated the subject areas. Subject areas included broad vegetation types, hydrologic regime, soil quality, aquatic and terrestrial animal categories. Riparian vegetation was identified at risk in some Management Areas, with varied reasons attributed to this risk. The results are summarized in Table V-91. The ecological reasons included low species diversity, loss of soil moisture, changes in the fire regime, vegetation structure had been altered, insect damage, noxious weeds, erosive soils, lacking woody debris, and lacking ground cover. The causes attributed to these were grazing, roads, recreation, mining, firewood gathering, timber harvest, and fire exclusion.

Table V-91. Properly Functioning Condition Assessment by Riparian Subject Area For Management Areas of the Ecogroup

PFC Subject Area	Regional PFC Risk Rating	Mgmt. Areas At PFC	Mgmt. Areas At Low Risk	Mgmt. Areas At Moderate Risk	Mgmt. Areas At High Risk	Number of Mgmt Areas Assessed*
Riparian Areas	High	9	27	19	4	59

*Based on district identification of significant vegetative subject areas within the management area

ENVIRONMENTAL CONSEQUENCES

Effects Common To All Alternatives

Resource Protection Methods

Resource protection has been integrated into vegetation diversity management direction at various scales, from national to site-specific. The cumulative positive effect of the multi-dimensional direction described below is beneficial protection and mitigation for all resources that may potentially be adversely affected by vegetation management activities.

Laws, Regulations, and Policies - Numerous laws, regulations, and policies govern the use and administration of vegetation resources on National Forest System lands. Some of the more important ones are described in *Appendix H*, Legal and Administrative Framework. National laws and regulations have also been interpreted for implementation in Forest Service Manuals, Handbooks, and Regional Guides. Regulations also set the minimum requirements for resource protection, vegetative manipulation, silvicultural practices, even-aged management, riparian areas, and biological diversity.

Forest Plan Direction - Although Forest Plan desired conditions for vegetation resources would vary somewhat by alternative; management direction for all alternatives has been developed to maintain or improve vegetative conditions on National Forest System lands. Direction occurs at both the Forest-wide and Management Area levels. Vegetation resource goals and objectives have been designed to achieve desired vegetation conditions over the long-term, in order to maintain or restore sustainable levels of biodiversity, habitat, recreational settings, timber and forage production, and ecosystem functions and processes. Vegetation standards and guidelines have been designed to protect upland and riparian vegetation, as well as other resources that could be adversely affected by vegetation management activities. Furthermore, management direction for other resource programs—such as soils, water, riparian, aquatic, wildlife, timber, range, and recreation—provide additional guidance and resource protection in an integrated manner.

The theory is that, by providing coarse filter vegetation components at amounts and distributions based on the historical ranges of variability, and by maintaining or restoring the ecological processes that supported those vegetation components, the Forests will also be providing the overall biological diversity necessary to sustain individual species of concern, while providing economic, social, and cultural opportunities for Forest users.

Protection for vegetation is provided by standards and guidelines at the Forest-wide and Management Area levels, by State of Idaho Best Management Practices, and by Forest Service Manual and Handbook direction. Detailed standards and guidelines for vegetation, wildlife, and soil resources that focus on maintaining habitat, ecological processes, and productivity are outlined in Chapter III of the Forest Plan for each Forest of the Ecogroup.

All alternatives have several MPCs in common that would feature the same types of management over the same areas. These MPCs include existing designated wilderness (1.1), Wild and Scenic Rivers (2.1), Research Natural Areas (2.2), and Boise Basin Experimental Forest (2.4). These administrative designations and their management prescriptions will remain the same across the range of alternatives.

Riparian Conservation Areas (RCAs) would also have similar management objectives across the six action alternatives. In the RCAs, any proposed action would be implemented to either maintain current conditions or to achieve riparian and aquatic goals and objectives. There may be temporary or short-term effects or benefits in RCAs, but any actions must demonstrate that they would benefit riparian and aquatic resources over the long term.

Forest Plan Implementation - Managing vegetation in relation to some range of desired conditions generally depends on current and site-specific information about local habitat types, current vegetative conditions, methods of vegetation treatment or management, duration and intervals of treatment, and biophysical limiting factors. These factors are not easily addressed at the programmatic level, or may be similar to all alternatives. Watershed and vegetative management planning processes, however, can and will address all of these factors at the project area or watershed scale. Through this process, which is the same for all alternatives, adjustments in management practices would be made to address resource concerns in a timely, effective, and site-specific manner that involves the Forest Service and the public in local land management actions. Actions would also be monitored and evaluated for any needed future adjustments. Recent improvements in inventory information and technology (LANDSAT imagery, GIS databases, etc.) allow Forest personnel to better identify current vegetation conditions and to track changes to those conditions over time. These improvements will also enhance the design and effectiveness of vegetation treatments and monitoring.

Currently, several vegetative groups and/or community types within the Ecogroup area have vegetation where structure, composition, disturbance regimes and patterns are outside of desired conditions. Vegetation diversity conditions are expected to move toward desired conditions under all alternatives with the implementation of Forest Plan management direction. However, the desired conditions and the rate of change may vary by alternative.

General Effects

Forested Vegetation - Forest management activities affect size class, density, species composition, and structure of forest stands. These activities include fire (wildland fire use and prescribed burning), mechanical activities associated with timber management and restoration, and road construction. Snags and coarse woody debris are also affected by these activities, and their future recruitment is a function of size class, density, species composition, and structure of forest stands. Of course, the amounts and distributions of vegetation components would vary by alternative, depending on the amounts, types, and timing of vegetative management prescribed. Management, such as mechanical thinning or prescribed fire, would likely result in relatively controlled and targeted changes to vegetation, whereas the effects from ecological processes would tend to be more stochastic in space and time. The effects to ecosystem components can be classified as either direct or indirect, as described below.

<u>*Direct Effects*</u> **–** The largest direct effects occur at the landscape scale. The Ecogroup area contains large amounts of many vegetation types across millions of acres. Depending upon the alternative chosen, the direction those vegetation conditions take will have far reaching effects, both in space and time. The diversity of seral stages, size classes, density, species composition, snags, and coarse woody debris and how these are distributed throughout the landscape will exert its influence in numerous ways and could have many direct and indirect benefits and/or negative effects. These areas of influence include the risk of uncharacteristic wildfire, wildlife habitat, watershed effects, and numerous others.

The alternatives vary as to the levels of risk for uncharacteristic wildfire. This is discussed further in the *Vegetation Hazard* and *Fire Management* sections in this chapter. Uncharacteristic wildfire can affect large tree, species composition, snag and coarse wood components, and alter seral stages. Many areas will require mechanical preparation of fuels before fire can be re-introduced as a management tool. Fire use, either alone or in tandem with mechanical treatments, may alter vegetation density, maintain vegetative conditions, or replace conditions to an earlier seral stage. However, long-term benefits include restoring fire regimes, hence restoring vegetative conditions. Fire affects snags and coarse wood in two ways: it creates them through tree mortality, and it destroys them through burning, particularly during uncharacteristic wildfires. As snags were often historically created in patches, prescribed burning used as a tool to restore fire regimes would benefit their creation in the long term. Wildfire, particularly when the fire is at intensities greater than the HRV, would create large pulses of snags and down logs in size classes reminiscent of the stands that burned. In general, the restoration of fire regimes would benefit the creation of snags and coarse wood.

Mechanical activities include those treatments necessary for vegetation management, whether for restoration or to meet growth and yield objectives. Mechanical activities can also alter size class, canopy cover, species composition, structure, and seral status. Mechanical activities associated with the alternatives can either reduce or increase the levels of snags and coarse wood on the landscape. Where the objective is for restoration, there can be short-term impacts with longer-term benefits. In mechanical activities with an objective of growth and yield, coarse woody debris can be reduced to make use of the wood, to clear sites for tree planting, and to reduce fire risk (Spies and Cline 1988, Pearson 1999). However; timber management, other mechanical activities, and prescribed burning can provide opportunities to create snags and coarse woody debris. Current guidelines in all alternatives would maintain or move snags and coarse woody debris toward desired conditions.

<u>*Indirect Effects*</u> **–** On a landscape level, effects will occur on the amounts and distribution of habitats for a wide variety of plant, fish, and wildlife species. Levels and rates of disturbance, soil-hydrological processes, and climatic influences are just some of the indirect effects that can occur from the large-scale management of the vegetation in the Ecogroup area.

The restoration or maintenance of vegetation conditions to reduce the levels of uncharacteristic and undesirable disturbances such as fire, insects, and pathogens would benefit forest species composition, size classes, canopy cover, structure, and the creation of snag and coarse wood diversity in the long term. However, structural simplification of stands, through either mechanical activities or uncharacteristic disturbance, can alter vegetative conditions and associated habitat. This could include changes in size, density, species composition, and structure. These changes could in turn affect processes such as soil erosion and nutrient cycling, and affect off-site attributes such as stream temperature. These actions can eliminate some large trees, snags, and fallen trees, thus reducing the range of tree sizes and growth forms that would be available as a future recruitment pool of coarse woody debris and affecting the geometrical spacing of trees and coarse woody debris (Franklin and Maser 1988). These actions not only affect the numbers and sizes of snags and down logs, but also their distribution on the landscape. Uncharacteristic disturbance can increase the levels beyond what was historical. Uncharacteristic lethal fire could affect processes such as litter fall, from which approximately 50 percent of soil organic material is derived (Covington and Sackett 1984, Laiho and Prescott 1999, Tiedemann et al. 2000).

Increases in noxious weed invasion and spread can occur as a result of increased roads, ground disturbance, or fire. Changes in growth stage and the rate of forest development can affect other resources, such as wildlife, soils, and fuels. The restoration of vegetation conditions to reduce the levels of uncharacteristic disturbance would benefit overall vegetative diversity and ecological processes. Alteration of vegetative conditions, whether through forest management activities or successional processes, changes responses to insects, disease, wind, and other endemic disturbance processes, with subsequent effects on forest composition and structure. Road construction and recreational development often have indirect effects on vegetative conditions, and can affect the numbers of snags due to increased access for firewood cutting and the increased need to remove hazard trees.

Non-forested Vegetation - Management activities affect species composition, size class, density and structure of non-forested vegetation and woodland communities. These activities include fire (wildland fire use and prescribed burning), grazing, mechanical/chemical activities, and road construction. The amounts and distributions of vegetation components would vary by alternative, depending on the amount, types, and timing of vegetative management prescribed. More active types of management, such as prescribed fire, would likely result in controlled and targeted changes to vegetation; the effects from ecological processes would tend to be more stochastic in space and time. The effects to ecosystem components can be classified as either direct or indirect, as described below.

Direct Effects – The largest direct effects occur at the landscape scale. The Ecogroup area contains large amounts of many vegetation types across millions of acres. Depending upon the alternative chosen, the direction the vegetation conditions take will have far reaching effects, both in space and time. The diversity of seral stages, size classes, density, and species composition and how these are distributed throughout the landscape will exert its influence in numerous ways and could have many direct and indirect benefits and/or negative effects. The areas of influence include risk of uncharacteristic wildfire, wildlife habitat, watershed effects, and numerous others.

Changes in vegetative composition and density directly alter the amount and kind of vegetation present, the amount of ground cover and organic input to the soil, and the effectiveness of terrestrial habitat. In sagebrush communities, the canopy cover will influence the composition of understory forbs and grass composition as the cover increases beyond 15 percent (Winward

2000). For example, where mountain big sagebrush community canopy closures are high, the herbaceous vegetation composition can be one-fourth to one-third less than site potential. The forbs are the first component to be affected, then grasses. The root system growth and development pattern, leaf type, and allelopathic influences of individual sagebrush plants create this phenomenon. Soil moisture is another critical factor for understory grass and forbs succession and development within sagebrush communities. Similar successional processes exist where pinyon-juniper stands occur (ICBEMP 1997c). Under all alternatives, every sagebrush and pinyon-juniper community has an inherent tendency to progress toward having denser canopy closures. The rate or final density may vary, depending upon specific management practices.

Management responses on rangelands are difficult to measure due to the extreme spatial and temporal variation of the vegetation (Wight 1987). Any fire disturbance that removes the overstory of sagebrush also has temporary, short-term, or long-term effects on other vegetative components and their successional development in the community. The season of fire disturbance will influence the amplitude of these effects. With few exceptions, there are temporary reductions in productivity and extent for all perennial grasses and forbs. Areas will see short-term and, in some cases, long-term effects on perennial species composition. Long-term effects are more dependent on the combination of perennials, annuals, and exotics present prior to the fire event. Sprouting shrubs may become prevalent in the short term and dominant, in some cases, in the long term. The effect of fire is variable on different plant species, depending upon their tolerance to fire, ability to resprout, and seed source available after a burn. Forbs generally respond better to burning than do grasses (Britton and Ralphs 1979)

Fire has often been used to reduce shrub density; however shrub reduction does not always increase herbaceous production, but may result in unplanned shifts in plant community composition (Fraas et al. 1992). The time required for increased grass production to occur depends upon the composition present at the time of the burn and the climatic condition at the time of and following the fire. Changes in perennial forb productivity is less variable that that of the perennial grasses. The effects of fire on shrub density are dependent upon the species, habitat types, and condition of the site (Bunting 1985). Fires will not carry in low sagebrush, allowing burning to create an ideal mosaic (Wright et al. 1979).

Fire disturbances can alter structure and composition of pinyon-juniper and aspen communities, and have effects on understory shrubs, forbs, and grasses. Regeneration of aspen stands can be enhanced with fire at appropriate intensities; aspen reproduces vigorously by root suckers following fires (Mueggler 1988). The effects of fire on pinyon and nonsprouting juniper trees depends largely upon the height of trees, herbaceous fuel, weather conditions, and season (Wright et al. 1979). Results of prescribed fires are often inconsistent (Wittie and McDaniel 1990).

Today, grazing pressure has decreased considerably compared to the early 1900s (Paige and Ritter 1999). However, as cattle graze sagebrush steppe, they first select grasses and forbs and avoid browsing on sagebrush, which can eventually tip the balance in favor of shrubs (Paige and Ritter, 1999), ultimately discouraging livestock use. Livestock also trample and damage biological soil crusts (Paige and Ritter 1999). Even if livestock are removed, the presence of invasive weeds, an overly dense stand of sagebrush, or heavy browsing by rodents and rabbits can inhibit recovery of grasses and forbs (Tisdale and Hironaka 1981). Any grazing system that results in heavy use of the herbaceous understory species during the growing season, even for a short period, has a chance to cause deterioration of native sagebrush-grass ranges (Laycock 1987). However, in some circumstances, livestock management can increase grass and forbs (Frischnecht 1979). Grazing can alter species composition and production in aspen groves; regeneration and growth into the larger size classes can also be inhibited.

Mechanical treatment and seeding of pinyon-juniper communities can alter structure and composition, improving native plant communities (Stevens 1999), and when used properly, enhance wildlife habitat (Commons et al. 1999, Fairchild 1999). However, these treatments can also encourage the growth of weedy species if not implemented and monitored properly. Changes in soil erosion and runoff can also occur with these types of activities. Small-scale and patchy applications of herbicides, such as tebuthiuron, can assist with breaking up dense canopies of sagebrush and pinyon-juniper, facilitating growth of understory species (Clary et al. 1985, Wittie and McDaniel 1990). Misuse of herbicides can have more severe degradation to plant species composition and alter stand structures. Off-road vehicle use can damage microbiotic soil crusts in sagebrush steppe habitats (Kaltenecker and Wicklow-Howard 1994).

Indirect Effects – On a landscape level, effects may occur on the amounts and distribution of habitats for a wide variety of plant, fish, and wildlife species. Levels and rates of disturbance, soil-hydrological processes, and climatic influences are just some of the indirect effects that can occur from the large-scale management of the vegetation in the Ecogroup area.

Changes in vegetative composition and density indirectly alter the diversity of terrestrial wildlife species, surface soil erosion rates, water quality, soil productivity, downstream riparian vegetation composition, aquatic habitat effectiveness, fire regimes, susceptibility to exotic plant invasion, and composition and regeneration of perennial grass and forbs, shrubs, and trees.

Repeated, frequent fires can eliminate sagebrush entirely. As the fire cycle escalates, cheatgrass persists and on some sites is eventually replaced by medusahead and other non-native annuals. Cheatgrass invasion fundamentally alters fire and vegetation patterns in sagebrush habitats, carrying fire over greater distances and at shorter intervals of 3-5 years (Paige and Ritter 1999). Fires also occur earlier in the season, as cheatgrass matures and dries earlier than native bunchgrasses (Knick and Rotenberry 1997).

Increases in noxious weed invasion and spread can occur as a result of increased roads, ground disturbance, or fire. Changes in seral structure stage and the rate of successional development can affect other resources, such as wildlife, soils, and fuels. The restoration of vegetation conditions to reduce the levels of uncharacteristic disturbance would benefit overall vegetative diversity and ecological processes. Alteration of vegetative conditions, whether through management activities or successional processes, changes responses to insects, disease, and other endemic disturbance processes, with subsequent effects on structure, composition, and the landscape mosaic. Road construction and recreational development often have indirect effects on vegetative conditions.

Riparian Vegetation - Riparian areas across all alternatives would receive special management protection for riparian and aquatic resources. The alternatives vary in the degree to which Forest Service management may maintain or restore vegetation within riparian management zones (RCAs/RHCAs). In some cases, particularly where there may be listed or sensitive species, vegetation may be managed to improve conditions for those species, but not specifically to meet vegetative desired conditions. Connectivity of forest types is provided through riparian forests. Activities or restoration that improves habitat for wildlife, fish, and botanical species in these corridors would provide ecological benefits for these species across the landscape. Vegetative conditions however, may remain outside of desired conditions in order to meet the more immediate needs of imperiled species. In areas without these species, riparian corridors with improved levels of large tree components, canopy cover, and species composition would effectively increase the connectivity between large blocks of old forests. Soil-hydrological processes within whole watersheds, and their many associated functions, would improve by maintaining and restoring desired riparian vegetation. Overall, the effect of improving conditions in riparian areas reaches far beyond individual streams and reaches.

Land management and ecological disturbances affect upland and riparian plant communities in several interrelated ways, including plant defoliation, nutrient redistribution, site moisture regime conversion, and mechanical impacts to soil and plant material.

Direct Effects - The restoration of all vegetation conditions to reduce the levels of uncharacteristic disturbance would benefit riparian zones. Altered fire regimes have induced risks in riparian zones. Prescribed burning used as a tool to restore fire regimes would benefit these areas in the long term.

Activities in the upland can have effects in riparian areas. These effects can include sedimentation, recruitment of large woody debris in streams, and overall condition of riparian vegetation. Roads in proximity to riparian areas influence sedimentation rates and provide access for firewood gathering, which can contribute to localized decreases in snags and coarse woody debris. Livestock grazing can affect riparian vegetation by altering vegetation composition and seral stages. Excessive runoff from poor condition sagebrush and grasslands, and direct damage to riparian vegetation and streambanks can result from livestock grazing and trampling, road construction, and recreational use (Blaisdell et al. 1982). The ability of streams, associated vegetation, and wildlife populations to recover after reduction in grazing stress appears to be situation specific and related to site characteristics, degree of degradation, and availability of native plant materials (Krueper 1993, Shaw 1992).

Indirect Effects – The activities mentioned above will often have indirect negative effects on riparian areas by increasing soil erosion, opening access to firewood cutting, precipitating the need to remove hazard trees, and limiting large woody debris in stream channels. Dispersed recreation occurring close to riparian areas can increase soil compaction, affecting vegetative processes. Off-road vehicle use can contribute to erosion and alter channel configurations. Any alteration of soil-hydrologic function--caused through timber harvest, road building, recreation, fires, mining, or grazing--poses risks to vegetative composition and structure in riparian zones, affecting ecological functions. In addition, the vegetative conditions in riparian zones may have indirect effects to habitat for wildlife, fish, and plants. Aquatic habitat effectiveness can be affected by the condition of riparian vegetation.

Direct And Indirect Effects By Alternative

Forest Plan revision has defined Desired Conditions (DCs) for vegetation, based on estimates of the HRV. The HRV represents the range of naturally occurring composition, structure, density, and ecological processes. This varies for different vegetation types or groups of habitat types because of differences in environmental characteristics and site productivity.

Forest Plan direction is designed to provide vegetation components at amounts and distributions as stated in the DCs, yet anchored to conditions that existed historically. The theory behind this direction is that by maintaining or restoring the components of vegetation and ecological processes, these components will provide the overall biological diversity necessary to sustain structural and functional elements of concern, including habitats for fish and wildlife, native plant communities, and goods and services for Forest users. This is known as the coarse-filter approach. The amounts and distributions of vegetation components would vary by alternative, depending upon management emphasis of the MPCs, and the relative amounts of MPCs in each alternative.

Forested Vegetation

The analysis depicts trends in vegetative conditions based on different management scenarios. Vegetation modeling estimated outcomes for the various alternatives (see *Appendix B*). The modeling describes what could happen as a result of implementing an alternative based on the MPCs and mix of tools, DCs, constraints, budgets, and other inputs. Because all alternatives start at the same current conditions, and a relatively small percentage of forested vegetation would be treated in the first decade under any alternative, there is little difference between alternatives in the short term. Differences between the alternatives become most apparent at approximately the fifth decade, and although outputs from the model become less reliable beyond the fifth decade, model outcomes beyond the fifth decade are examined to determine any particular trends in vegetation over the much longer term.

A mathematical comparison is used to determine whether or not the outcomes from the modeling deviate from the distributions for the desired conditions. Comparisons are also made with the estimated historical range of variability. This was analyzed to assist with the determination of whether or not the modeled values are within the desired ranges (DC). The comparisons with HRV for size class and canopy closure are also used as a means to compare alternatives, since each alternative has a different DC. For species composition, snags, coarse woody debris and designated wilderness areas, the DC and the HRV are the same, so no separate comparison is necessary.

Size Class - Each alternative at different time periods is compared with the DC for size class for that particular alternative, to determine how far away the predicted condition is from a DC for a particular alternative.

For each decade under consideration, size class by PVG is also compared to the estimate of the mean of HRV as described by Morgan and Parsons (2001), since HRV represents the anchor by which to compare conditions and their ability to best meet biophysical functions. The mean is used, rather than the entire range to make comparisons to the HRV, because the range is not appropriate for this purpose. Rare, extreme events define these bounds, and spatial and temporal limits usually are not well defined in sufficiently explicit terms to make comparisons with the range (Landres et al. 1999). These values vary between PVGs. As discussed, the DCs were developed around a range of HRV. HRV is used as an additional method to compare the alternatives because DCs differ across the range of alternatives.

Areas within designated wilderness and outside of designated wilderness are evaluated separately, as the modeling process used to predict outcomes over time under the different alternatives treated these areas separately due to the differences in desired conditions.

Payette National Forest - Table V-92 shows size class deviations from desired conditions by alternative and PVG outside of designated wilderness. Table V-93 displays the results of the analysis for the 5th decade by indicating whether the 5th decade conditions are in or out of desired conditions. By decade 5, Alternatives 2, 3, 4, and 5 have three PVGs each that are within the desired conditions. PVG 7 is within desired conditions for the most alternatives (5), followed by PVG 6 (4). Alternatives 1B and 7 have two PVGs each that are within the desired conditions, followed by Alternative 6 with only one PVG. No PVGs are within desired conditions currently. Alternatives 2, 3, and 4 have three PVGs each within HRV after the fifth decade, followed by Alternatives 1B, 5, and 7 with two PVGs within HRV. Alternative 6 has one PVG within the HRV for large tree size class after the fifth decade. For Alternatives 3 and 4, the DC and the mean of HRV are the same for the large tree size class. No PVGs are within the HRV currently.

Generally in PVG 1, there is a lack of large trees, except for meeting desired conditions for Alternatives 1B and 5. These alternatives have DCs with less acreage in the large tree size class than the other alternatives. PVGs 2 and 11 lack large trees in all alternatives, and PVGs 4 and 5 lack large trees in all alternatives except Alternative 5. PVG 3 generally has not enough acres in the G/F/S/S stage and too many in the large size class. PVG 6 has too many large trees to meet the respective DCs except for Alternative 6, as do PVGs 7, 8/9, and 10 (medium trees) in all alternatives. It must be remembered that each alternative has different DCs; and the analysis focused on how well each alternative meets its respective DC.

Table V-92. Differences Between Modeled Outcomes on the Payette National Forest for Size Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	G/F/S/S Large	- 0.2 + 2.5	- 0.7 -18.7	-0.9 -40.7	-1.0 -40.7	-1.8 +26.4	-1.0 -30.6	-4.7 -20.8
PVG 2	G/F/S/S Large	- 1.2 -24.8	- 1.0 -40.9	-1.3 -53.9	-1.7 -57.5	-2.8 -10.0	-1.7 -55.8	-2.4 -23.7
PVG 3	G/F/S/S Large	-11.0 +29.2	-10.0 +19.7	-7.0 +11.5	-2.0 +4.4	-12.0 +20.5	-5.0 -7.0	-8.0 +1.2
PVG 4	G/F/S/S Large	- 0.3 - 7.2	- 0.5 - 0.5	-0.2 -5.7	+1.2 -13.5	-0.6 +19.1	0 -13.0	-0.9 -13.0
PVG 5	G/F/S/S Large	- 4.1 -32.2	- 0.1 -30.3	-0.3 -37.3	-3.0 -43.5	-7.2 +2.9	-3.0 -46.7	-0.3 -17.6
PVG 6	G/F/S/S Large	-15.2 +11.6	- 4.8 +15.3	-3.2 +3.2	+1.8 +1.7	-8.1 +19.7	+0.8 -2.5	-4.2 +8.2
PVG 7	G/F/S/S Large	- 0.6 +13.7	- 0.6 + 9.2	-4.6 +5.5	0 +6.2	-2.4 +6.8	-0.5 +10.3	-5.0 +5.7
PVG 8/9	G/F/S/S Large	- 4.4 +15.6	- 1.4 +15.7	-0.4 +15.9	+1.4 +15.3	-7.3 +13.9	+0.5 +15.2	-10.9 +14.3
PVG 10	G/F/S/S *Medium	+ 2.4 +22.6	- 1.1 +14.0	-13.0 +20.0	+1.0 +21.8	-0.5 +18.6	-0.5 +16.2	-1.2 +18.2
PVG 11	G/F/S/S Large	+11.3 - 1.2	- 0.8 - 8.2	-0.6 -14.2	+1.3 -14.2	-0.8 -7.1	-0.5 -13.3	-0.8 -13.1

*PVG 10 is medium tree size class, as trees do not typically grow to a large class size.

Table V-93. Results on the Payette National Forest Between Modeled Outcomes For Size Class in the 5th Decade with the Desired Conditions

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	**In**	Out	Out	Out	Out	Out	Out
PVG 2	Out	Out	Out	Out	**In**	Out	Out
PVG 3	Out	Out	Out	**In**	Out	Out	Out
PVG 4	**In**	**In**	**In**	Out	Out	Out	Out
PVG 5	Out	Out	Out	Out	Out	Out	Out
PVG 6	Out	Out	**In**	**In**	Out	**In**	**In**
PVG 7	Out	**In**	**In**	**In**	**In**	Out	**In**
PVG 8/9	Out	Out	Out	Out	Out	Out	Out
PVG 10	Out	Out	Out	Out	Out	Out	Out
PVG 11	Out	**In**	Out	Out	**In**	Out	Out

After the 10th decade, Alternative 4 has six PVGs within DC, followed by Alternatives 2 and 7 with four PVGs each, Alternatives 3 and 6 with three PVGs each, Alternative 1B with two PVGs, and Alternative 5 with one PVG that is within range for meeting the DC for size class. While some PVGs have now moved into the DC, others that were previously in have moved out. Alternative 4 has the most PVGs (6) within HRV, followed by Alternative 2 with five PVGs, Alternatives 1B, 3, 5, and 7 with three PVGs, and Alternative 6 with two PVGs within the HRV.

The results after the 15th decade display that Alternative 7 has four PVGs within DC, followed by Alternatives 2 with three PVGs each, Alternatives 1B and 3 with two PVGs each, and Alternatives 5 and 6 with one PVG that is within range for meeting the DC for size class. It should be noted that overall, the number of PVGs meeting the DC in any alternative is less than in the previous decades considered. Furthermore, model reliability goes down the further out that projections are made. Alternative 2 and 7 have the most PVGs (5) within HRV, followed by Alternatives 1B and 5 with four PVGs, Alternatives 3 and 6 with two PVGs, and Alternative 4 with one PVG.

Table V-94 shows size class deviations from desired conditions by alternative and PVG for the designated wilderness, as well as the results of the analysis for the 5th decade by indicating if conditions are in or out of desired conditions. By decade 5, PVGs 3, 4, 7, and 10 are within the desired condition. Currently only PVG 10 is within the DC. The other PVGs are primarily lacking in the large tree size class, except for PVG 8/9, which has too many acres in the large tree size class, and PVG 11, which has too many acres in the G/F/S/S class. There is no HRV analysis for the Wilderness, since the DC is the HRV.

Table V-94. Differences Between Modeled Outcomes in the Payette Wilderness for Size Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size Classes	5th Decade (Percent of Acres)	Desired/ Historical Estimate (Percent of Acres)	Difference with Desired/Historical	Within Desired/Historical
PVG 1	G/F/S/S Large	0.6 49.0	2.0 91.0	- 1.4 -42.0	Out
PVG 2	G/F/S/S Large	2.3 28.4	3.0 80.0	- 0.7 -51.6	Out
PVG 3	G/F/S/S Large	6.0 40.5	7.0 41.0	- 1.0 - 0.5	**In**
PVG 4	G/F/S/S Large	3.4 36.4	4.0 34.0	- 0.6 +2.4	**In**
PVG 5	G/F/S/S Large	1.0 31.8	3.0 84.0	- 2.0 -52.2	Out
PVG 6	G/F/S/S Large	5.3 30.0	7.0 56.0	- 1.7 -26.0	Out
PVG 7	G/F/S/S Large	8.6 29.2	9.0 21.0	- 0.4 + 8.2	**In**
PVG 8/9	G/F/S/S Large	6.9 32.3	7.0 21.0	- 0.1 +11.3	Out

PVG	Size Classes	5th Decade (Percent of Acres)	Desired/ Historical Estimate (Percent of Acres)	Difference with Desired/Historical	Within Desired/Historical
PVG 10	G/F/S/S *Medium	13.7 25.8	14.0 20.0	- 0.3 + 5.8	**In**
PVG 11	G/F/S/S Large	16.6 19.5	11.0 27.0	+ 5.6 - 7.5	Out

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

The results from the 10th and 15th decades in the Wilderness on the Payette National Forest display that PVGs 1, 2, 3, 5, and 6 are within DC after the 10th decade; other PVGs have moved out of the DC. The 15th decade is the same, except for PVG 3, which is no longer within the DC. It should be noted that model reliability goes down the further out that projections are made.

Boise National Forest - Table V-95 shows size class deviations from desired conditions by alternative and PVG. Table V-96 displays the results of the analysis for the 5th decade. By decade 5, Alternatives 1B, 2, 3, 6, and 7 have four PVGs each that are within the desired condition. Alternatives 4 and 5 have three PVGs within the DC. PVGs 6 and 7 are within desired conditions for all alternatives. No PVGs are within the DC currently. Alternatives 2, 3, and 6 have 4 PVGs each within HRV after the fifth decade. These alternatives are followed by Alternative 4 with three PVGs, Alternative 1B and 7 with two PVGs, and Alternative 5 with one PVG within the HRV for large tree size class after the fifth decade. Currently, there are no PVGs within the HRV.

Generally in PVG 1, there is a lack of large trees, except for Alternative 5. PVGs 2, 5, and 11 lack large trees in all alternatives. Other PVGs vary in how they do not meet the DCs. PVG 3 generally has not enough acres in the G/F/S/S stage and too many in the large size class. PVGs 7 and 10 generally have too many acres in large or medium trees to meet the specified DCs. PVG 4 has too many acres in large and G/F/S/S classes in several alternatives and PVG 6 is variable between the alternatives. It must be remembered that each alternative has different DCs; and the analysis focused on how well each alternative meets its respective DC.

Table V-95. Differences Between Modeled Outcomes on the Boise National Forest for Size Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	G/F/S/S Large	+0.3 -10.4	-0.8 -31.2	-0.9 -53.2	+0.3 -53.5	0 +12.7	-0.3 -43.1	-4.7 -31.2
PVG 2	G/F/S/S Large	-0.3 -25.1	-0.4 -50.0	-1.2 -60.0	-0.6 -59.8	-5.1 -10.0	-0.9 -56.0	-2.2 -28.6
PVG 3	G/F/S/S Large	-7.9 +1.7	-6.0 +10.6	-0.7 +0.6	+1.1 +0.7	-6.7 +8.4	+1.4 -3.7	-7.0 +11.0

PVG	Size Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 4	G/F/S/S Large	+9.4 +2.4	+2.5 +10.5	+1.8 +6.5	+7.0 -8.9	+12.0 +6.1	+1.3 -2.4	-0.7 +2.6
PVG 5	G/F/S/S Large	-4.1 -29.3	-0.3 -42.8	-0.5 -49.6	-0.2 -35.1	-7.7 -11.6	-0.7 -40.4	-0.3 -15.3
PVG 6	G/F/S/S Large	-5.2 -6.0	+0.5 +6.7	+0.1 -4.4	+3.6 -6.8	-5.5 +5.8	+3.3 +1.6	-0.7 +5.5
PVG 7	G/F/S/S Large	-0.6 +4.4	-0.6 +0.8	-0.5 +2.0	-0.3 +0.4	-5.5 0	-0.4 +2.7	-0.8 +0.2
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
PVG 10	G/F/S/S *Medium	+2.1 +8.6	-1.1 +15.4	+1.8 +15.4	+2.9 +17.7	-0.5 +14.4	-0.5 +18.4	-1.1 +8.4
PVG 11	G/F/S/S Large	-1.1 -0.9	-1.0 -7.1	-0.6 -13.2	+0.4 -13.0	-1.0 -6.1	-0.7 -13.1	-0.9 -13.3

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

Table V-96. Results on the Boise National Forest Between Modeled Outcomes for Size Class in the 5th Decade with the Desired Conditions

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	**In**	Out	Out	Out	Out	Out	Out
PVG 2	Out	Out	Out	Out	Out	Out	Out
PVG 3	Out	**In**	**In**	**In**	Out	**In**	Out
PVG 4	Out	Out	**In**	Out	Out	**In**	**In**
PVG 5	Out	Out	Out	Out	Out	Out	Out
PVG 6	**In**	**In**	**In**	**In**	**In**	**In**	**In**
PVG 7	**In**	**In**	**In**	**In**	**In**	**In**	**In**
PVG 8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10	Out	Out	Out	Out	Out	Out	**In**
PVG 11	**In**	**In**	Out	Out	**In**	Out	Out

After the 10th decade, Alternatives 4, 6, and 7 have five PVGs within DC, followed by Alternative 3 with four PVGs each, Alternatives 1B and 2 with three PVGs each, and Alternative 5 with no PVGs that are within range for meeting the DC for size class. Alternatives 2, 3, and 4 have the most PVGs (4) within HRV, followed by Alternatives 1B and 6 with three PVGs, Alternative 7 with two PVGs, and Alternative 5 with one PVG within the HRV.

The results after the 15th decade display that Alternatives 3, 4, and 7 have three PVGs within DC, followed by Alternative 1B with two PVGs each, and Alternatives 2, 5, and 6 with one PVG that is within range for meeting the DC for size class. It should be noted, overall the number of PVGs meeting the DC in any alternative is less than in the previous decades considered.

Furthermore, model reliability goes down the further out that projections are made. Alternative 5 has the most PVGs (5) within HRV, followed by Alternatives 1B and 2 with four PVGs, Alternatives 3 and 6 with three PVGs, and Alternatives 4 and 7 with two PVGs within the HRV.

<u>Sawtooth National Forest</u> - Table V-97 shows size class deviations from desired conditions by alternative and PVG for the Sawtooth National Forest outside of designated wilderness. Table V-98 displays the results of the analysis for the 5th decade. By decade 5, Alternatives 1B, 3, 5, 6, and 7 have two PVGs each that are within the DC. Alternative 2 has one PVG within the DC and Alternative 4 has none. Currently, Alternatives 3, 4, and 7 have 2 PVGs each that are within the DC; however the mix of PVGs within DCs has changed. Alternatives 1B and 3 have three PVGs each within HRV after the fifth decade. These alternatives are followed by Alternatives 2 and 5 with two PVGs, Alternatives 4 and 6 with one PVG, and Alternative 7 with no PVGs within the HRV for large tree size class after the fifth decade. Currently, there are two PVGs within the HRV.

Generally in PVG 1, there is a lack of large trees, except for Alternative 5. PVGs 2 and 11 lack large trees in all alternatives. Other PVGs vary in how they do not meet the DCs. PVG 3 varies with each alternative as to whether it is lacking or has surpluses of a particular size class. PVG 4 generally has too many large trees, except for Alternative 4. PVGs 7 and 10 have too many large and medium trees. It must be remembered that each alternative has different DCs; and the analysis focused on how well each alternative meets its respective DC.

After the 10th decade, Alternative 6 has three PVGs within DC, followed by Alternatives 1B, 3, and 4 with two PVGs each, and Alternatives 2, 5, and 7 with one PVG each that are within range for meeting the DC for size class. Alternative 6 has the most PVGs (3) within HRV, followed by Alternatives 3 and 4 with two PVGs, and Alternatives 1B, 2, 4, and 7 with one PVG each. Alternative 5 has no PVGs within the HRV.

Table V-97. Differences Between Modeled Outcomes on the Sawtooth National Forest for Size Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	G/F/S/S Large	+0.5 -14.0	-2.0 -35.0	-2.0 -57.1	-1.0 -57.0	-2.0 +10.0	-1.0 -47.1	-2.0 -54.2
PVG 2	G/F/S/S Large	-1.4 -3.0	-2.8 -50.0	-3.0 -60.0	-1.4 -57.5	-8.0 -10.0	-1.0 -59.2	-5.9 -49.0
PVG 3	G/F/S/S Large	-1.6 +10.3	-5.2 +7.1	-0.4 -0.7	+5.7 -6.8	-3.0 +4.6	+0.9 -20.0	-8.0 -3.1
PVG 4	G/F/S/S Large	-1.8 +25.5	+1.2 +9.6	-0.2 +8.2	+15.9 -7.1	-2.7 +19.1	-0.2 +2.0	-0.7 +1.6
PVG 5	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
PVG 6	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A

PVG	Size Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 7	G/F/S/S Large	-6.3 +16.7	-0.6 +17.8	0 +16.8	+1.3 +15.6	-5.3 +17.1	-0.4 +13.3	-0.8 +15.5
PVG 8/9	G/F/S/S Large	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
PVG 10	G/F/S/S *Medium	-6.3 +11.6	-1.1 +8.3	-0.7 +13.4	+10.3 +9.8	-0.5 +2.2	-0.5 +10.2	-1.1 +9.7
PVG 11	G/F/S/S Large	-1.4 -0.6	-0.8 -3.7	-0.6 -9.7	-0.3 -9.7	+1.5 -9.2	-0.4 -8.8	-0.8 -8.7

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

Table V-98. Results on the Sawtooth National Forest Between Modeled Outcomes for Size Class in the 5th Decade with the Desired Conditions

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Out	Out	Out	Out	Out	Out	Out
PVG 2	**In**	Out	Out	Out	Out	Out	Out
PVG 3	Out	Out	**In**	Out	**In**	Out	Out
PVG 4	Out	Out	**In**	Out	Out	**In**	**In**
PVG 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	Out	Out	Out	Out	Out	Out	Out
PVG 8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10	Out	Out	Out	Out	**In**	Out	Out
PVG 11	**In**	**In**	Out	Out	Out	**In**	**In**

The results after the 15th decade display that Alternative 7 has three PVGs within DC, followed by Alternatives 2, 3, 4, and 6 with one PVG each, and Alternatives 1B and 5 with no PVGs that are within range for meeting the DC for size class. It should be noted that overall, the number of PVGs meeting the DC in any alternative is less than in the previous decades considered. Furthermore, model reliability goes down the further out that projections are made. Alternatives 1B and 5 have the most PVGs (3) within HRV, followed by Alternatives 2 and 7 with two PVGs, and Alternatives 3, 4, and 6 with one PVG within the HRV.

Table V-99 shows size class deviations from desired conditions by PVG for the areas within designated wilderness, as well as the results of the analysis is for the 5th decade. By the end of decade 5, PVGs 2, 3, and 4 are within the desired condition. The current condition has only PVG 10 within the DC. The other PVGs are primarily lacking in the large tree size class, except for PVG 7 that is also lacking acres in the G/F/S/S class and PVG 10, which has an abundance of medium trees. There is no HRV analysis for the Wilderness, since the DC is the HRV.

Table V-99. Differences Between Modeled Outcomes in the Sawtooth Wilderness for Size Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size Classes	5th Decade (Percent of Acres)	Desired/Historical Estimate (Percent of Acres)	Difference with Desired/Historical	Within Desired/Historical
PVG 1	G/F/S/S Large	2.8 9.6	2.0 91.0	+ 0.8 -81.4	Out
PVG 2	G/F/S/S Large	2.7 63.1	3.0 80.0	- 0.3 -16.9	**In**
PVG 3	G/F/S/S Large	5.9 41.5	7.0 41.0	- 1.1 + 0.5	**In**
PVG 4	G/F/S/S Large	3.0 36.7	4.0 34.0	0 +2.7	**In**
PVG 5	G/F/S/S Large	N/A	N/A	N/A	N/A
PVG 6	G/F/S/S Large	N/A	N/A	N/A	N/A
PVG 7	G/F/S/S Large	3.8 14.4	9.0 21.0	- 5.2 - 6.0	Out
PVG 8/9	G/F/S/S Large	N/A	N/A	N/A	N/A
PVG 10	G/F/S/S *Medium Tree	8.6 50.0	14.0 20.0	- 5.4 +30.0	Out
PVG 11	G/F/S/S Large	4.8 2.6	11.0 27.0	- 6.2 -24.4	Out

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

The results after the 10th decade display that PVGs 2 and 3 are within the DC; this remains the same in the 15th decade except that PVG 1 is added and PVG 3 is no longer within the DC. It should be noted that overall the number of PVGs meeting the DC in any alternative is less than in the previous decades considered. Furthermore, model reliability goes down the further out that projections are made.

Canopy Closure - Each alternative at different time periods is compared with the DC for canopy closure for that particular alternative, to determine how far away the predicted condition is from a DC for a particular alternative. A mathematical comparison is applied to determine whether or not the modeled canopy closure classes deviate from the expected distribution of the DC. This was analyzed for the canopy closure classes together. The absolute acreages in the large tree low, moderate, and high canopy closure classes are compared directly with the DC expected acreages. Therefore, if the large tree size class overall is below or above the DC, this will also affect the canopy closure distributions of large trees.

For each decade under consideration, canopy closure class by PVG is also compared to the estimate of the mean of HRV as described by Morgan and Parsons (2001), since HRV represents the anchor by which to compare conditions and their ability to best meet biophysical functions. The mean is used, rather than the entire range, to make comparisons to the HRV because the range is not appropriate for this purpose. Rare, extreme events define these bounds, and spatial and temporal limits usually are not well defined in sufficiently explicit terms to make comparisons with the range (Landres et al. 1999). These values vary between PVGs. Each PVG is compared with the historical estimate of large tree canopy closure classes and the difference is calculated. The condition being compared in this case is, of the large trees that are on the landscape, how are they distributed between the three canopy closure classes? A mathematical comparison is applied to determine whether or not the modeled canopy closure classes deviate from the estimated distribution of historical. This was analyzed for the canopy closure classes together within each PVG for which there is an historical estimate.

Areas within designated wilderness and outside of designated wilderness are evaluated separately, as the modeling process used to predict outcomes over time under the different alternatives treated these areas separately due to the differences in desired conditions.

Payette National Forest - Table V-100 shows canopy closure deviations from desired conditions by alternative and PVG for areas outside of designated Wilderness. Table V-101 displays the results of the analysis for the 5^{th} decade, which indicates whether modeled conditions are in or out of desired conditions. By decade 5, Alternative 5 has three PVGs each that are within the desired condition. PVG 7 is within desired conditions for the most alternatives, followed by PVG 11. Alternatives 1B, 3, and 7 have two PVGs each that are within the desired conditions, followed by Alternatives 2 and 4 with only one PVG. Alternative 6 has no PVGs that meet the DC. Currently, only Alternative 1B has one PVG within the DC. Alternatives 2, 3, and 7 have three PVGs each within HRV after the fifth decade, followed by Alternatives 4 and 6 with two PVGs each within HRV. Alternatives 1B and 5 have no PVGs within the HRV for large tree canopy closure class after the fifth decade. Currently, no PVGs are within the HRV.

Generally in PVG 1, there is a lack of large trees, but they are distributed well with regards to canopy closure, except for Alternatives 1B and 5. Here there are also too many acres in the moderate canopy closure class to meet the DCs for these alternatives. PVGs 2 is lacking large trees in the low canopy closure class and has too many in the other classes. PVGs 3, 4, 6, 8/9, and 10 have too many acres in the high canopy closure class. PVG 5 is lacking large trees overall, hence there are not enough in the low/moderate classes to meet the DCs. PVG 11 is also lacking large trees overall, particularly in the moderate class. PVG 7 has too many large trees in the moderate canopy closure class. It must be remembered that each alternative has different DCs; and the analysis focused on how well each alternative meets its respective DC.

Table V-100. Differences Between Modeled Outcomes on the Payette National Forest For Canopy Closure Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size/Canopy Closure Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Large Low	-10.4	-18.7	-40.7	-40.7	-1.3	-30.6	-20.8
	Large Mod.	+36.6	0	0	0	+27.7	0	0
	Large High	0	0	0	0	0	0	0
PVG 2	Large Low	- 7.0	-37.4	-48.7	-52.0	+1.0	-50.9	-12.2
	Large Mod.	-33.0	- 8.2	+38.1	-11.1	-14.3	-10.4	+15.4
	Large High	+15.2	+ 3.8	+1.8	+5.6	+3.3	+5.5	+4.1
PVG 3	Large Low	0	- 0.4	-6.0	-4.7	0	-4.8	-7.0
	Large Mod.	- 1.7	- 2.0	+35.0	-5.2	-1.4	-18.1	-44.0
	Large High	+30.9	+22.1	+52.5	+14.4	+21.6	+15.9	+52.2
PVG 4	Large Low	+ 0.7	- 0.1	-0.1	-0.1	0	-0.3	-0.6
	Large Mod.	- 9.1	-11.2	-9.1	-21.8	-8.5	-21.5	-16.9
	Large High	+ 1.2	+10.8	+34.1	+8.4	+17.6	+8.8	+4.5
PVG 5	Large Low	- 8.8	-17.1	-16.0	-19.7	-1.0	-27.9	-9.4
	Large Mod.	-28.6	-13.7	-21.3	-23.9	-1.5	-18.8	-10.5
	Large High	+ 5.2	+ 0.4	0	0	+5.4	0	+2.3
PVG 6	Large Low	0	0	0	0	0	0	0
	Large Mod.	- 2.7	- 2.1	-3.6	-11.5	-3.0	-15.4	-1.5
	Large High	+14.2	+17.4	+0.7	+13.2	+22.7	+12.8	+9.7
PVG 7	Large Low	- 0.2	- 0.1	-0.1	-0.1	-0.4	-0.1	-0.1
	Large Mod.	+13.9	+ 9.3	+5.6	+6.3	+7.1	+10.4	+5.8
	Large High	0	0	0	0	0	0	0
PVG 8/9	Large Low	0	0	0	0	0	0	0
	Large Mod.	- 0.3	- 1.8	-0.7	-8.0	+0.8	-8.6	-2.1
	Large High	+15.9	+17.4	+16.5	+31.2	+13.1	+23.8	+16.4
PVG 10*	Medium Low	0	0	0	0	0	0	+0.5
	Medium Mod.	+ 4.0	- 0.9	+4.0	-6.5	+7.4	-6.5	-2.4
	Medium High	+18.5	+15.0	+18.3	+30.3	+11.2	+22.7	+20.0
PVG 11	Large Low	- 0.5	- 1.0	-0.2	-2.0	-6.7	-0.2	-1.1
	Large Mod.	- 0.7	- 7.2	-14.1	-12.2	-0.4	-13.2	-12.0
	Large High	0	0	0	0	0	0	0

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

Table V-101. Results for the Payette National Forest Between Modeled Outcomes for Canopy Closure Class in the 5th Decade with the Desired Conditions

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Out	Out	Out	Out	Out	Out	Out
PVG 2	Out	Out	Out	Out	Out	Out	Out
PVG 3	Out	Out	Out	Out	Out	Out	Out
PVG 4	**In**	Out	Out	Out	Out	Out	Out
PVG 5	Out	Out	Out	Out	**In**	Out	Out
PVG 6	Out	Out	**In**	Out	Out	Out	**In**
PVG 7	Out	Out	**In**	**In**	**In**	Out	**In**
PVG 8/9	Out	Out	Out	Out	Out	Out	Out
PVG 10	Out	Out	Out	Out	Out	Out	Out
PVG 11	**In**	**In**	Out	Out	**In**	Out	Out

After the 10th decade, Alternatives 4 and 7 have three PVGs within DC, followed by Alternatives 2, 3, and 6 with two PVGs each. Alternatives 1B and 5 have no PVGs within range for meeting the DC for canopy closure class. Alternative 6 has the most PVGs (5) within HRV, followed by Alternatives 2, 3, and 4 with four PVGs, Alternative 7 with two PVGs, and Alternatives 1B and 5 have no PVGs within HRV.

The results after the 15th decade display that Alternative 7 has 4 PVGs within DC, followed by Alternatives 2, 3, and 4 with 3 PVGs each. Alternatives 1B, 5, and 6 have no PVGs within range for meeting the DC for canopy closure class. Model reliability goes down the further out that projections are made. Alternatives 2, 3, and 4 have the most PVGs (5) within HRV, followed by Alternatives 6 and 7 with 4 PVGs. Alternatives 1B and 5 have no PVGs within the HRV.

Table V-102 shows canopy closure class deviations from desired conditions for the Payette Wilderness, as well as the results of the analysis for the 5th decade. By the end of decade 5, PVGs 7 and 11 are within the desired condition. Currently, there are no PVGs in the Wilderness within the DC. The other PVGs are primarily lacking in the large tree size class, contributing to a shortage in the large tree canopy closure classes, except for PVGs 3, 4, and 10 where the distribution of trees is not in the desired canopy closures. What large trees are on the landscape, tend to be in denser canopy closure classes than would be desired. With regards to meeting the HRV, we looked at the large trees that are on the landscape and how they are distributed amongst the canopy closure classes. PVGs 1, 6, 7, and 11 meet the HRV distribution of large trees into the various canopy closure classes. Currently, there are no PVGs in the Wilderness that meet the HRV distribution.

Table V-102. Differences Between Modeled Outcomes in the Payette Wilderness for Canopy Closure in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size/Canopy Closure Classes	Current	Difference with Desired Condition	Within Desired Conditions
PVG 1	Large Low Large Moderate Large High	49.0 0 0	-42.0 0 0	Out
PVG 2	Large Low Large Moderate Large High	10.8 5.5 12.1	-57.2 - 6.5 +12.1	Out
PVG 3	Large Low Large Moderate Large High	4.0 25.6 10.8	- 2.0 - 9.4 +10.8	Out
PVG 4	Large Low Large Moderate Large High	0.5 11.6 24.4	- 0.5 -21.4 +24.4	Out
PVG 5	Large Low Large Moderate Large High	0 26.0 5.7	-29.0 -29.0 + 5.7	Out
PVG 6	Large Low Large Moderate Large High	0 28.7 1.3	0 -27.3 + 1.3	Out
PVG 7	Large Low Large Moderate Large High	0.9 28.3 0	- 0.1 + 8.3 0	**In**
PVG 8/9	Large Low Large Moderate Large High	0 0.8 31.5	0 -12.2 -23.5	Out
PVG 10*	Medium Low Medium Moderate Medium High	0 12.6 13.3	0 - 5.4 +11.3	Out
PVG 11	Large Low Large Moderate Large High	1.8 17.7 0	- 0.2 - 7.3 0	**In**

*PVG 10 refers to medium tree size class

After the 10th decade, PVG 1 is the only one within the DC; none of the PVGs are within the DC in the 15th decade. Model reliability goes down the further out that projections are made. PVGs 1, 5, 7, and 11 are within the HRV for the 10th decade, and PVG 11 is the only one remaining within HRV in the 15th decade.

Boise National Forest - Table V-103 shows canopy closure deviations from desired conditions by alternative and PVG for the Boise Forest. Table V-104 displays the results of the analysis for the 5th decade. By decade 5, Alternatives 2, 4, 5, 6, and 7 have three PVGs each that are within the desired condition. PVG 7 is within desired conditions for all alternatives. Alternatives 1B and 3 have two PVGs each that meet the DC. In the current condition, there are 6 alternatives with one PVG each within a DC. Alternative 4 has 4 PVGs within HRV after the fifth decade, followed by Alternative 3 with three PVGs, Alternatives 2, 6, and 7 with two PVGs each, and Alternatives 1B and 5 have no PVGs within the HRV for large tree canopy closure class after the fifth decade. In the current condition, there are no PVGs within the HRV.

Generally in PVG 1, there is a lack of large trees, but they are distributed well with regards to canopy closure, except for Alternatives 1B and 5. Here there are also too many acres in the moderate canopy closure class to meet the DCs for these alternatives. PVGs 2 and 5 are lacking large trees in the low and moderate canopy closure classes and have too many in the high class. PVGs 3, 4, 6, and 10 have too many acres in the high canopy closure class. PVG 11 is also lacking large trees overall, particularly in the moderate class. It must be remembered that each alternative has different DCs; and this analysis focused on how well each alternative meets its respective DC.

Table V-103. Differences Between Modeled Outcomes on the Boise National Forest for Canopy Closure Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size/Canopy Closure Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Large Low	-31.6	-31.2	-53.2	-53.5	-14.0	-43.1	-31.2
	Large Moderate	+21.2	0	0	0	+26.8	0	0
	Large High	0	0	0	0	0	0	0
PVG 2	Large Low	-7.1	-46.7	-54.9	-54.2	+1.0	-57.3	-11.1
	Large Moderate	-40.5	-5.0	-5.3	-9.8	-15.0	-3.0	-18.4
	Large High	+22.6	+0.7	+0.2	+4.2	+4.0	+4.4	+1.0
PVG 3	Large Low	0	-0.2	-0.3	-0.3	0	-3.5	-0.1
	Large Moderate	-13.3	-2.4	-9.1	-8.0	-4.5	-7.3	-7.7
	Large High	+15.0	+13.3	+10.1	+9.1	+12.9	+7.1	+18.7
PVG 4	Large Low	+0.5	-0.1	-0.1	-0.1	0	-0.3	-0.1
	Large Moderate	-8.4	-5.7	-5.0	-11.7	-10.3	-15.1	-3.6
	Large High	+10.3	+16.3	+11.7	+2.8	+16.3	+13.0	+6.3
PVG 5	Large Low	-5.6	-19.0	-22.8	-11.0	-2.8	-21.5	-3.2
	Large Moderate	-33.2	-0.8	-26.8	-24.1	-9.0	-21.8	-12.6
	Large High	+9.5	0	0	0	+0.2	+2.8	+0.4
PVG 6	Large Low	0	0	0	0	0	0	0
	Large Moderate	-19.0	-2.1	-5.0	-9.4	-9.8	-6.5	-4.0
	Large High	+13.1	+8.8	+0.6	+2.6	+15.6	+8.1	+9.5
PVG 7	Large Low	+2.4	-0.1	-0.1	-0.1	-1.7	-0.1	-0.1
	Large Moderate	+1.9	+0.8	+2.1	+0.4	+1.7	+2.7	+0.3
	Large High	0	0	0	0	0	0	0
PVG 8/9	Large Low	NA	NA	NA	NA	NA	NA	NA
	Large Moderate	NA	NA	NA	NA	NA	NA	NA
	Large High	NA	NA	NA	NA	NA	NA	NA
PVG 10*	Medium Low	0	+1.4	0	0	0	+0.7	0
	Medium Moderate	+7.0	-0.9	-0.9	-1.3	+6.7	-3.4	-0.8
	Medium High	+1.6	+14.9	+16.3	+19.0	+7.7	+21.1	+9.3
PVG 11	Large Low	-0.6	-1.0	-2.0	-2.0	-5.7	-2.0	-24.0
	Large Moderate	-0.3	-6.1	-11.2	-11.0	-0.4	-11.1	-11.3
	Large High	0	0	0	0	0	0	0

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

Table V-104. Results for the Boise National Forest Between Modeled Outcomes for Canopy Closure Class in the 5th Decade with the Desired Conditions

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Out	Out	Out	Out	Out	Out	Out
PVG 2	Out	Out	Out	Out	Out	Out	Out
PVG 3	Out	Out	Out	**In**	Out	**In**	Out
PVG 4	Out	Out	Out	Out	Out	Out	**In**
PVG 5	Out	Out	Out	Out	**In**	Out	**In**
PVG 6	Out	**In**	**In**	**In**	Out	**In**	Out
PVG 7	**In**	**In**	**In**	**In**	**In**	**In**	**In**
PVG 8/9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10	Out	Out	Out	Out	Out	Out	Out
PVG 11	**In**	**In**	Out	Out	**In**	Out	Out

After the 10th decade, Alternatives 4 and 7 have four PVGs within DC, followed by Alternatives 2, 3, and 6 with three PVGs each. Alternative 1B has 2 PVGs within the DC and Alternative 5 has no PVGs within range for meeting the DC for canopy closure class. Alternative 3 has the most PVGs (6) within HRV, followed by Alternative 7 with five PVGs, and Alternatives 2, 4, and 6 with four PVGs. Alternatives 1B and 5 have no PVGs within HRV at the 10th decade.

The results after the 15th decade display that Alternatives 3, 4, and 6 have three PVGs within DC, followed by Alternatives 2 and 7 with two PVGs each. Alternatives 1B and 5 have no PVGs within range for meeting the DC for canopy closure class. It should be noted, overall the number of PVGs meeting the DC in any alternative is less than in the previous decades considered. Model reliability goes down the further out that projections are made. Alternatives 3, 4, and 7 have the most PVGs (5) within HRV, followed by Alternative 6 with four PVGs, and Alternative 2 with three PVGs. Alternatives 1B and 5 have no PVGs within the HRV.

Sawtooth National Forest - Table V-105 shows canopy closure deviations from desired conditions by alternative and PVG for areas outside of designated wilderness. Table V-106 displays the results of the analysis for the 5th decade. By the end of decade 5, Alternative 4 has three PVGs each that are within the desired condition, followed by Alternatives 3 and 7 with two PVGs each, and Alternatives 1B, 2, 5, and 6 with one PVG each. PVG 11 is within desired conditions for 6 of the 7 alternatives. The current condition has 7 alternatives with 1 PVG each within the DC. Alternatives 2 and 3 have four PVGs each within HRV after the fifth decade, followed by Alternatives 4 and 6 with three PVGs, Alternatives 5 and 7 with two PVGs each, and Alternative 1B with one PVG within the HRV for large tree canopy closure class after the fifth decade. In the current condition, only PVG 10 is within the HRV.

Generally in PVG 1, there is a lack of large trees, but they are distributed well with regards to canopy closure, except for Alternatives 1B and 5. Here there are also too many acres in the moderate canopy closure class to meet the DCs for these alternatives. PVG 2 is lacking large trees in the low and moderate canopy closure classes and has too many in the high class. PVGs 3, 4, and 10 have too many acres in the high canopy closure class. PVG 7 generally has too many trees in the moderate canopy closure class. PVG 11 is lacking large trees overall. It must be remembered that each alternative has different DCs; and the analysis focused on how well each alternative meets its respective DC.

Table V-105. Differences Between Modeled Outcomes on the Sawtooth National Forest for Canopy Closure Class in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size/Canopy Closure Classes	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Large Low	-29.9	-35.0	-57.1	-57.0	-15.8	-47.1	-54.2
	Large Moderate	+15.9	0	0	0	+25.8	0	0
	Large High	0	0	0	0	0	0	0
PVG 2	Large Low	-5.6	-44.9	-52.3	-51.7	+12.8	-53.5	-34.7
	Large Moderate	-23.9	-7.8	-7.7	-9.2	-22.6	-12.0	-14.7
	Large High	+26.5	+1.8	0	+3.3	0	+6.3	+0.4
PVG 3	Large Low	0	-0.3	-0.5	-1.3	0	-7.0	-0.3
	Large Moderate	-10.7	-2.3	-8.3	-10.1	-8.5	-14.2	-14.5
	Large High	+21.0	+9.7	+8.1	+4.5	+13.1	+1.2	+11.7
PVG 4	Large Low	0	-0.1	-0.1	-0.1	0	-0.1	-0.1
	Large Moderate	-2.2	-5.8	-8.5	-11.2	-9.7	-13.2	-5.6
	Large High	+27.7	+15.5	+16.8	+4.2	+28.8	+15.2	+7.3
PVG 5	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Moderate	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Moderate	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	Large Low	-0.7	-0.1	-0.1	-0.1	-6.0	-0.1	-0.1
	Large Moderate	+27.4	+17.8	+16.8	+15.7	+23.1	+13.3	+15.6
	Large High	0	0	0	0	0	0	0
PVG 8/9	Large Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large Moderate	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Large High	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 10*	Medium Low	0	0	+1.8	+0.6	0	+1.4	0
	Medium Moderate	+4.9	-7.6	-1.4	-7.7	-0.5	-7.7	-2.5
	Medium High	+6.7	+12.9	+13.0	+16.8	-6.4	+16.5	+12.2
PVG 11	Large Low	-0.5	-0.1	-0.1	-0.1	-8.8	-0.1	-0.7
	Large Moderate	-0.2	-7.1	-9.6	-8.6	-0.4	-8.7	-8.0
	Large High	0	0	0	0	0	0	0

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

Table V-106. Results for the Sawtooth National Forest Between Modeled Outcomes for Canopy Closure Class in the 5th Decade with the Desired Conditions

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Out	Out	Out	Out	Out	Out	Out
PVG 2	Out	Out	Out	Out	Out	Out	Out
PVG 3	Out	Out	**In**	**In**	Out	Out	Out
PVG 4	Out	Out	Out	**In**	Out	Out	**In**
PVG 5	Out	Out	Out	Out	Out	Out	Out
PVG 6	Out	Out	Out	Out	Out	Out	Out
PVG 7	Out	Out	Out	Out	Out	Out	Out
PVG 8/9	Out	Out	Out	Out	Out	Out	Out
PVG 10	Out	Out	Out	Out	**In**	Out	Out
PVG 11	**In**	**In**	**In**	**In**	Out	**In**	**In**

After the 10th decade, Alternatives 2, 4, 6, and 7 have two PVGs within DC, followed by Alternatives 3 and 5 with one PVG each. Alternative 1B has no PVGs within the DC. Alternative 4 has the most PVGs (5) within HRV, followed by Alternatives 2, 3, and 7 with four PVGs, Alternative 6 with three PVGs, Alternative 5 with two PVGs, and Alternatives 1B with one PVG within HRV at the 10th decade.

The results after the 15th decade display that Alternative 7 has three PVGs within DC, followed by Alternatives 3 and 4 with two PVGs each, and Alternative 6 with one PVG. Alternatives 1B, 2, and 5 have no PVGs within range for meeting the DC for canopy closure class. It should be noted that overall, the number of PVGs meeting the DC in any alternative is less than in the previous decades considered. Furthermore, model reliability goes down the further out that projections are made. Alternatives 2, 3, 4, and 7 have the most PVGs (4) within HRV, followed by Alternative 6 with three PVGs, and Alternative 1B with one PVG. Alternative 5 has no PVGs within the HRV.

Table V-107 shows canopy closure class deviations from desired conditions for the Sawtooth Wilderness, as well as the results of the analysis for the 5th decade. By the end of decade 5, PVG 7 is within the desired condition. In the current condition, only PVG 10 is within the DC. The other PVGs, except PVG 10, are primarily lacking in the large tree size class, contributing to a shortage in the large tree canopy closure classes. What large trees are on the landscape tend to be in denser canopy closure classes than would be desired. PVG 10 has too many trees in the moderate and high canopy closure classes. Large trees on the landscape were looked at to see how they were distributed amongst the canopy closure classes compared to their HRV distribution. None of the PVGs met the HRV distribution of large trees into the various canopy closure classes. In the current condition, none of the PVGs meet the HRV either.

Table V-107. Differences Between Modeled Outcomes in the Sawtooth Wilderness for Canopy Closure in the 5th Decade with the Desired Conditions, Expressed as a Percent of Acres

PVG	Size/Canopy Closure Classes	Current	Difference with Desired Condition	Within Desired Conditions
PVG 1	Large Low Large Mod. Large High	1.0 8.6 0	-90.0 + 8.6 0	Out
PVG 2	Large Low Large Mod. Large High	0 4.0 59.1	-68.0 - 8.0 +59.1	Out
PVG 3	Large Low Large Mod. Large High	5.5 26.1 10.0	- 0.5 - 8.9 +10.0	Out
PVG 4	Large Low Large Mod. Large High	0.8 13.3 2.4	- 0.2 -21.7 +22.4	Out
PVG 5	Large Low Large Mod. Large High	N/A	N/A	N/A
PVG 6	Large Low Large Mod. Large High	N/A	N/A	N/A
PVG 7	Large Low Large Mod. Large High	0 14.4 0	- 1.0 - 5.6 0	**In**
PVG 8/9	Large Low Large Mod. Large High	N/A	N/A	N/A
PVG 10*	Medium Low Medium Mod. Medium High	0% 29.2% 20.8%	0% +11.2% +18.8%	Out
PVG 11	Large Low Large Mod. Large High	0.6% 2.0% 0%	- 1.4% -23.0% 0%	Out

*PVG 10 is medium tree size class because trees in this PVG typically do not grow to large class size.

The results after the 10th decade display that none of the PVGs are within the DC; none of the PVGs are within the DC in the 15th decade either. Overall the number of PVGs meeting the DC in any alternative is less than in the previous decades considered. Model reliability goes down the further out that projections are made. PVGs 7 and 11 are within the HRV for both the 10th decade and 15th decade. They do not meet the DC because overall there are too many acres in large trees; however, they do meet the distributions of canopy closures for the large trees that would be expected under HRV, hence they meet the HRV.

Species Composition - Wildfire, insects and disease, fire use, roads, and mechanical treatment disturbances all influence species composition—as does ecological succession. When the forested landscape continues to develop without disturbance, species composition moves toward climax vegetative species such as grand fir, subalpine fir, and in some PVGs, Douglas-fir. Disturbance provides the conditions that favor seral species such as ponderosa pine, western larch, lodgepole pine, and in some PVGs Douglas-fir. In some cases, a mix of seral and climax can occur depending on the disturbance, or the transition stages between cover types during succession. Insect outbreaks that kill seral species (Douglas-fir bark beetle, western pine beetle, mountain pine beetle) can accelerate the landscape toward climax vegetation. However, other insects can affect climax species (spruce budworm, Douglas-fir tussock moth, fir engraver beetle), shifting the landscape toward seral species.

The desired condition is the estimated historical ranges for species composition. Future species composition cannot be determined with modeling outputs; however, we can estimate future seral stages as a proxy for species composition. In order to estimate probable future seral stages to represent species composition, the acreages that went into the different modeling pathways (See Appendix B) are used as a measure of how much of a PVG is following successional processes vs. how much is being managed or is subject to disturbances. An increase in deviations from historical seral status represents an increase in departure from desired/historical conditions, usually an increase in late seral or climax species. Conversely, a decrease in deviations generally represents a shift toward desired/historical conditions. In most cases, this is a shift toward earlier seral species. However, this varies depending on the historical status of the PVG. Some PVGs were mostly early seral, while others were maintained as a mix of seral or even climax species. The deviations represent relative values to qualify this change. If a PVG historically consisted of seral species, but is currently composed of both seral and climax species (mixed), this represents a relative deviation of 1.0 from the historical condition. If a PVG historically was comprised of both seral and mixed species, but has lost the seral species in the current condition, a deviation of 0.5 captured this change. A similar scenario exists for those PVGs that historically were mixed, but are currently comprised of mixed and climax species. The largest relative changes are when a PVG was seral historically, and is currently climax species. This constitutes a deviation of 2.0 to display how much further these PVGS are from the HRV for species composition. This comparison does not apply to PVG 10, which generally expresses itself as a persistent seral.

Payette National Forest - Table V-108 shows the projected seral status for each alternative. Those in bold face are within the desired/historical conditions. Table V-109 displays seral status deviations from desired/historical seral status by alternative and PVG for each Forest. The current condition is also displayed to show how the alternatives vary from the current conditions. Alternative 1B on the Payette increases the seral status deviations from the current condition, while the other alternatives reduce them. Alternative 4 has the most PVGs with seral status closest to DC/HRV, followed in order by Alternatives 3, 2 and 6, and 5 and 7. The Wilderness is equivalent to Alternative 3, although with a different mix of PVGs reaching desired/historical seral status. PVGs 8/9 are within desired/historical seral status in all alternatives and the Wilderness, followed by PVGs 1 and 5 that are within the DC/HRV for 6 alternatives (including the Wilderness).

Table V-108. Projected Seral Status (Species Composition) for Each Alternative on the Payette National Forest[1]

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Wilderness
PVG 1	Mixed	Seral	Seral	Seral	Mixed	Seral	Seral	Seral
PVG 2	Mixed-climax	Seral-mixed	**Seral**	**Seral**	Seral-mixed	Seral	Seral-mixed	Seral-mixed
PVG 3	Mixed-climax	Mixed-climax	Climax	Mixed-climax	Mixed-climax	Mixed-climax	Climax	Mixed-climax
PVG 4	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed	Mixed-climax
PVG 5	Mixed	**Seral-mixed**	**Seral-mixed**	**Seral-mixed**	**Seral-mixed**	**Seral-mixed**	Mixed	**Seral-mixed**
PVG 6	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	**Mixed-climax**	Mixed-climax	Mixed
PVG 7	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Climax	Mixed-climax	Mixed-climax
PVG 8/9[2]	Climax	Climax	Climax	Climax	Climax	Climax	Climax	Climax
PVG 11	Mixed	Mixed-climax	Mixed-climax	Mixed	Mixed	Mixed-climax	Mixed-climax	Mixed-climax

[1]PVG 10 not considered because historical condition would be primarily all one species (lodgepole pine).
[2]PVGs 8/9 are modeled together on Payette due to small amount of acreage in each.

Table V-109. Payette National Forest Species Composition Changes from Historical Seral Status for the Current Condition and Alternatives by Forest and PVG[1]

PVG	Current Condition	Alternative							
		1B	2	3	4	5	6	7	Wilderness
1	0.5	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
2	1.0	1.5	0.5	0.0	0.0	0.5	0.0	0.5	0.5
3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	0.5
4	0.0	0.5	0.5	0.0	0.5	0.5	0.5	0.0	0.5
5	1.0	0.5	0.0	0.5	0.0	0.0	0.0	0.5	0.0
6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
7	0.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0
8/9[2]	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1.5	0.5	1.0	1.0	0.5	0.5	1.0	1.0	1.0
Total deviations from DC/HRV	**5.5**	**6.0**	**4.0**	**3.5**	**3.0**	**4.5**	**4.0**	**4.5**	**3.5**

[1]PVG 10 not considered because historical condition would be primarily all one species (lodgepole pine).
[2]PVGs 8/9 are modeled together on Payette due to small amount of acreage in each.

<u>Boise National Forest</u> - Table V-110 shows the projected seral status for each alternative. Those in bold face are within the desired/historical conditions. Table V-111 displays seral status deviations from desired/historical seral status by alternative and PVG for each Forest. The current condition is also displayed to show how the alternatives vary from the current conditions.

Alternative 6 on the Boise increases the seral status deviations from the current condition. Alternative 1B on the Boise does not change the deviations from the current condition, while the other alternatives reduce them. Alternatives 3 and 4 have the most PVGS with seral status closest to DC/HRV, followed by Alternatives 2, 5, and 7. PVGs 1 and 5 are within desired/historical seral status in the most alternatives (5), followed by PVG 4, which is within DC/HRV in four alternatives.

Table V-110. Projected Seral Status (Species Composition) for Each Alternative on the Boise National Forest[1]

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
PVG 1	Mixed	Seral	Seral	Seral	Mixed	Seral	Seral
PVG 2	Mixed-climax	Seral-mixed	Seral-mixed	Seral-mixed	Seral-mixed	**Seral-mixed**	Mixed
PVG 3	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax
PVG 4	Mixed	Mixed-climax	Mixed	Mixed	Mixed-climax	Mixed-climax	Mixed
PVG 5	Mixed	**Seral-mixed**	**Seral-mixed**	**Seral-mixed**	**Seral-mixed**	Mixed	**Seral-mixed**
PVG 6	Mixed	Mixed-climax	Mixed-climax	Mixed-climax	Mixed	**Mixed-climax**	Mixed-climax
PVG 7	Mixed	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Climax	Mixed-climax
PVG 8/9[2]	**N/A**	N/A	N/A	N/A	N/A	N/A	N/A
PVG 11	Mixed	Mixed-climax	Mixed	Mixed	Mixed	Mixed-climax	Mixed-climax

[1]PVG 10 is not considered because the HRV would be primarily all one species (lodgepole pine).
[2]PVGs 7/8/9 are modeled together on Boise due to small total acreage of PVGs 8 and 9.

Table V-111. Boise National Forest Species Composition Changes from Historical Seral Status for the Current Condition and Alternatives by Forest and PVG[1]

PVG	Current Condition	Alternatives						
		1B	2	3	4	5	6	7
1	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
2	1.0	1.5	0.5	0.5	0.5	0.5	0.5	1.0
3	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5
4	0.0	0.0	0.5	0.0	0.0	0.5	0.5	0.0
5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.0
6	0.5	0.0	0.5	0.5	0.5	0.0	0.5	0.5
7[2]	0.0	0.5	1.0	1.0	1.0	1.0	1.5	1.0
11	1.5	0.5	1.0	0.5	0.5	0.5	1.0	1.0
Total deviations from DC/HRV	**4.5**	**4.5**	**4.0**	**3.0**	**3.0**	**4.0**	**5.0**	**4.0**

[1]PVG 10 not considered because historical condition would be primarily all one species (lodgepole pine).
[2]PVGs 7/8/9 are modeled together on Boise due to small total acreage of PVGs 8 and 9.

Sawtooth National Forest - Table V-112 shows the projected seral status for each alternative. Those in bold face are within the desired/historical conditions. Table V-113 displays seral status deviations from desired/historical seral status by alternative and PVG for each Forest. The current condition is also displayed to show how the alternatives vary from the current conditions. All alternatives reduce the deviations in seral status, except the Sawtooth Wilderness, which increases the seral status deviations from the current conditions. Alternatives 4 and 6 have the most PVGs with seral status closest to DC/HRV, followed by Alternatives 2, 3, 5, 7, and 1B. PVG 1 is within desired/historical seral status in the most alternatives (5), followed by PVG 2 with 4 alternatives bringing them within the DC/HRV.

Table V-112. Projected Seral Status (Species Composition) for Each Alternative on the Sawtooth National Forest[1]

PVG	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Wilderness
PVG 1	Mixed	Seral	Seral	Seral	Seral-mixed	Seral	Seral	**Climax**
PVG 2	Mixed	Seral	Seral	Seral	Seral	**Seral-mixed**	Seral-mixed	Climax
PVG 3	Mixed-climax	Mixed-climax	Mixed-climax	Mixed	Mixed-climax	Mixed	**Mixed-climax**	Mixed-climax
PVG 4	**Mixed-climax**	Mixed-climax	**Mixed-climax**	Mixed	Mixed-climax	Mixed-climax	Mixed	**Mixed-climax**
PVG 5[2]	**N/A**	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 6[2]	**N/A**	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 7	Climax	Mixed-climax	Mixed-climax	Climax	Mixed-climax	Mixed-climax	Mixed-climax	Climax
PVG 8/9[2]	**N/A**	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PVG 11	Mixed-climax	Mixed-climax	Mixed-climax	Mixed-climax	Mixed	Mixed	Mixed-climax	Climax

[1]PVG 10 not considered because historical condition would be primarily all one species (lodgepole pine).
[2]PVGs 5, 6, and 8/9 were not assessed on the Sawtooth as they do not occur or are of insignificant acreages.

Table V-113. Sawtooth National Forest Species Composition Changes from Historical Seral Status for the Current Condition and Alternatives by Forest and PVG[1]

PVG[2]	Current Condition	Alternative						
		1B	2	3	4	5	6	7	Wilderness
1	2.0	1.0	0.0	0.0	0.0	0.5	0.0	0.0	2.0
2	1.0	1.0	0.0	0.0	0.0	0.0	0.5	0.5	2.0
3	1.0	0.5	0.5	0.5	0.0	0.5	0.0	0.5	0.5
4	0.0	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5
7	1.0	1.5	1.0	1.0	1.5	1.0	1.0	1.0	1.5
11	1.0	1.0	1.0	1.0	1.0	0.5	0.5	1.0	1.5
Total deviations from DC/HRV	**6.0**	**5.5**	**3.0**	**3.0**	**2.5**	**3.0**	**2.5**	**3.0**	**8.0**

[1]PVG 10 not considered because historical condition would be primarily all one species (lodgepole pine).
[2]PVGs 5, 6, and 8/9 were not assessed on the Sawtooth as they do not occur or are of insignificant acreages.

Synthesis of Indicators - In order to summarize information about the three components of forested vegetation (size class, canopy closure, and species composition), all three components are examined together, for each decade. The rankings completed above were reviewed, and then considered as to which alternatives best meet both their DC and come within the mean of HRV. These would be the alternatives that are designed with the right mix of MPCs to meet the DCs, and have a lesser degree of risk as previously described, in terms of meeting HRVs. Alternatives that best meet the DC are also identified, regardless of HRV, because some alternatives were not designed solely to meet HRV, but to consider social and economic concerns as well. These alternatives generally fall within the full range of HRV, but do not meet the mean of the range.

Another consideration in this synthesis is the overall acres that may meet a DC and/or HRV. Several of the PVGs only contain small amounts of acreage (less than 5 percent of total acres) on a particular Forest. This acreage breakdown was not considered in the rankings above since some PVGs have high ecological significance although they comprise a small percentage of the total acreage. In this synthesis of indicators, PVGs that comprise less than 5 percent of the total Forest are not included in the rankings, to better understand the landscape level effects across a Forest, by alternative. PVGs that comprise less than 5 percent of the total Forest acres include 1, 3, and 4 on the Payette, 5 and 11 on the Boise, and 1, 2, and 3 on the Sawtooth National Forest. This analysis does not mean to imply that these PVGs are not important ecologically, despite the small amount of acreage they incorporate. However, they do not play a large role in landscape level change compared across the different alternatives.

Fifth Decade **-** This is the decade that probably holds the most weight, in terms of how an alternative would affect the forested vegetation landscape. This is the decade where substantive differences between the alternatives are first detected, and it is not so far out on a time-scale that model reliability goes down appreciably. On the Payette National Forest, overall, the best alternative for meeting both the DC and the HRV would be Alternative 3, followed by Alternatives 4 and 7. Alternative 2 comes next, and Alternatives 1B, 5, and 6 are all ranked last. For only meeting the DC, since all alternatives are not designed to be within the mean of HRV, Alternative 3 would also rank first, followed by Alternative 7. Alternatives 4 and 5 would be third, Alternative 2 would be fourth, and lastly would be Alternatives 1B and 6. Collectively, Alternative 3 is the best overall alternative for vegetation diversity on the Payette National Forest; Alternative 7 would be second, and Alternative 4 would be third.

On the Boise National Forest for meeting both the DC and HRV overall in the synthesis of components, Alternative 3 would rank first, followed by Alternative 4, then Alternatives 2 and 7. Alternatives 5 and 6 would be next, and 1B would be last. For meeting only the DC, since all alternatives are not designed to be within the mean of HRV, Alternative 3 would be first, then Alternative 7, followed by Alternatives 4, 2, and 5, and Alternatives 1B, and 6 would be last. Collectively, Alternatives 3, 4, and 7 would be the best overall alternatives on the Boise National Forest.

For the Sawtooth National Forest overall in the synthesis of components, Alternative 3 would be the best for meeting both the DC and the HRV (it is ranked highly in all components), followed by Alternative 7, then Alternative 4, then Alternatives 5 and 6. Alternatives 1B and 2 would be ranked last. For meeting only the DC, since all alternatives are not designed to be within the mean of HRV, Alternative 7 would be the best, followed by Alternative 3, then Alternative 6, then Alternative 5, and Alternatives 1B, 2, and 4 would be last. Collectively, Alternatives 3 and 7 would be the best overall alternatives on the Sawtooth National Forest.

In all cases, although the designated wilderness acres do not change by alternative, they do contribute to overall Forest DCs. In decade 5, the Wilderness on the Payette is within the DC (HRV) for PVGs 3, 4, 7, and 10 in size class, PVGs 7 and 11 for canopy closure, and species composition improves over the current condition, thus enhancing conditions for those PVGs. The Sawtooth Wilderness contributes to PVGs 2, 3, and 4 in size class, and PVG 7 for canopy closure class. Species composition would worsen in the Wilderness, however, for all PVGs relative to the current condition.

Tenth Decade **-** On the Payette National Forest, Alternative 4 is the best for meeting both the DC and the HRV, followed by Alternative 2, then Alternative 3. For meeting only the DC, since all alternatives are not designed to be within the mean of HRV, Alternative 4 is the best alternative, followed by Alternative 2, then Alternatives 3 and 7. Overall at the end of ten decades, Alternative 4 would be the best alternative for meeting vegetation diversity needs. Alternative 4 is ranked third for the fifth decade.

On the Boise National Forest, Alternative 3 is the best for meeting both the DC and the HRV, followed by Alternative 4, then Alternatives 6 and 7. For meeting only the DC, since all alternatives are not designed to be within the mean of HRV, Alternative 7 is the best, followed by Alternatives 3, 6, and 7. Overall at the end of ten decades, Alternatives 3 and 7 appear to be the best. These alternatives were highly ranked in the fifth decade also.

For the Sawtooth National Forest, Alternative 6 is the best for meeting both the DC and the HRV, followed by Alternatives 4 and 7. For meeting only the DC, since all alternatives are not designed to be within the mean of HRV, Alternative 6 is also the best, followed by Alternative 7, then Alternative 4. Overall at the end of ten decades, Alternative 6 would be the best alternative, followed by Alternatives 4 and 7. Only Alternative 7 was highly ranked in the fifth decade.

The Wilderness on the Payette would contribute by having PVGs 1, 2, 3, 5, and 6 within the DC/HRV for size class, PVG 1 for canopy closure class, and species composition improves over the current condition, thus enhancing conditions in these PVGs. The Sawtooth Wilderness contributes by having PVGS 2 and 3 within DC/HRV for size class. None of the PVGS are within the DC/HRV for canopy closure class. It does not improve conditions for species composition.

Fifteenth Decade **-** Model results are considered much less reliable in this decade, but it is interesting to note if any alternatives continue on a particular trend. Many of the constraints in the model are released this far out in the projection.

For the Payette National Forest, Alternative 2 would be the best for meeting the DC and HRV, followed by Alternative 4, then Alternatives 3 and 7. For meeting the DC only, Alternative 2 is the best, followed by Alternatives 4 and 7, then Alternative 2. Overall, Alternative 2 would be the best Alternative. The trend of consistently seeing Alternatives 3, 4, and 7 as good alternatives continues. Alternative 2 is generally ranked in the middle.

On the Boise National Forest, Alternative 3 would be the best for meeting the DC and HRV, followed by Alternative 4. For meeting the DC only, Alternatives 3 and 4 are the best, followed by Alternatives 6 and 7. Overall, Alternatives 3 and 4 would be the best. The trend of consistently seeing Alternative 3 as a good alternative continues. Alternative 4 is generally ranked in the middle.

For the Sawtooth National Forest, Alternative 7 would be the best for meeting the DC and HRV, followed by Alternatives 2, 4, and 6. For meeting the DC only, Alternative 7 is the best, followed by Alternatives 2, 4, and 6. Overall, Alternative 7 appears to be the best after fifteen decades. The trend of consistently seeing Alternative 7 as a good alternative continues.

The ranking of alternatives is due to a variety of factors including specific desired conditions, inherent vegetative development, management prescription categories, management objectives, and budgets. All these interact to determine the amount of vegetative management and/or disturbances that occurs. There are different DCs between alternatives. For example, not as many large trees are needed to meet the DCs for Alternatives 1B and 5. In some PVGs, the current conditions are so far from the DCs, that it would take more than five decades to grow enough trees into the large size class to meet the DC. For Alternatives 1B and 5, less acreage in the large tree size class is desired, hence it may be easier to meet the DCs in a shorter time period.

Those landscapes operating within or close to historical conditions are expected to be more resistant and resilient to endemic levels of insects, disease, and fire, and to produce characteristic responses. That does not mean that epidemic insect outbreaks or lethal fire won't occur, but rather that these disturbance agents would operate and function within ecosystems in an expected or predictable manner. In turn, ecosystem elements, processes, and functions that revolve around vegetation would operate as expected. The timing of disturbances will also affect the trend an alternative takes.

Different alternatives display differences in the numbers of PVGs or forested acres that are within DC. What differ between them are the relative amounts by which the alternatives meet their desired conditions (numbers of PVGs and/or amount of acres of forested vegetation) and the rates at which the alternatives may achieve desired conditions. In the case of the Sawtooth Wilderness, the small total size of the area makes it difficult to implement management that is compatible with the wilderness desired condition.

Snags and Coarse Woody Debris

Although each of the alternatives results in resource conditions that remain within or move toward the DCs, effects across the landscape would differ in terms of specific plant community attributes and structural components. Because live trees becomes dead trees, and dead trees become coarse wood, the effects of the alternatives on snags and coarse woody debris will to a large extent be influenced by what occurs to live trees. Forest-wide standards and guidelines provide direction to retain and create snags and coarse wood, but the material to retain or create them must first be present on the landscape. Coarse wood management focuses on recruitment of all size classes; however, past management practices have resulted in localized losses in recruitment of large-diameter classes, which research to date has shown to be the most important for wildlife habitat (Pearson 1999). Furthermore, the amount of coarse woody debris should be sufficient for long-term productivity needs, though this may best be determined at the site-specific level (Page-Dumroese, pers. comm. 2000). The DCs have distributions that are largely skewed to the larger-diameter size classes. Therefore, large-diameter tree recruitment should be a goal for snags and coarse wood.

In this analysis, each alternative is evaluated as to its capacity to produce large- and medium-sized trees as the recruitment pool of snags and coarse woody debris. This is a somewhat different analysis than what was done for size class above. That analysis compared changing conditions to a DC or HRV value; this analysis compares the absolute values of the alternatives in terms of providing large (and medium) trees, across all PVGs.

The alternatives differ by their capacity to produce large and medium size trees, given the mix of MPCs and the activities in those MPCs for each alternative. The second, fifth, and tenth decades are examined to see how the recruitment pool of snags and coarse woody debris differs by alternative. The second decade was used to determine any change in the recruitment pool, because it may take many years for snags and coarse woody debris to develop after an adequate recruitment pool is available. Furthermore, as these are live trees, it could still be several decades beyond the second before the trees would become snags or coarse wood. The current condition only pertains to the acres outside of designated wilderness. Tables V-114 and V-115 present the values for the second decade for large and medium trees, respectively.

The Wilderness acres do not change with the alternative. On the Payette National Forest, all alternatives increase the large trees from the current condition by the second decade, except Alternatives 1B and 5. Alternative 3 puts the highest percentage of large trees on the landscape, followed by Alternative 2, then Alternative 4. Alternative 7, followed by Alternative 6, are intermediate in their abilities to put large trees on the landscape. Regarding medium trees, all alternatives increase them relative to the current condition. Alternative 1B does the best job, followed in descending order by Alternatives 3 and 7, 6, 2, 5, and 4. Overall, Alternative 3, then Alternative 7 would do the best jobs of putting the highest percentages of both large and medium trees on the landscape by the end of the second decade. The Wilderness contributes to large trees above the current condition.

Table V-114. Percentage of Total Forested Acres of Large Trees by Alternative in Second Decade

National Forest	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Wilderness
Payette	14.6	13.7	16.9	17.0	16.6	13.9	15.1	15.5	15.6
Boise	10.7	9.5	13.3	14.5	14.3	13.3	12.9	11.7	N/A
Sawtooth	12.9	13.2	14.1	18.2	16.5	16.0	14.6	13.7	4.4

Table V-115. Percentage of Total Forested Acres of Medium Trees by Alternative in Second Decade

National Forest	Current	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Wilderness
Payette	24.9	32.8	31.2	31.8	30.4	31.0	31.5	31.8	28.0
Boise	27.9	35.5	34.6	34.5	37.0	34.6	37.1	35.7	N/A
Sawtooth	20.3	23.9	25.1	25.3	25.7	24.5	23.2	23.0	24.4

On the Boise National Forest, all alternatives increase the large trees from the current condition by the second decade, except Alternative 1B. Alternative 3, then Alternative 4 put the highest percentage of large trees on the landscape. Alternatives 2 and 5 follow this, then Alternative 6, then Alternative 7, all of which are intermediate in their abilities to put large trees on the landscape. Regarding medium trees, all alternatives increase them relative to the current condition. Alternatives 6 and 4 do the best job, followed by Alternatives 7 and 1B, then Alternatives 2, 5, and 3. Overall, Alternative 4 would do the best jobs of putting the highest percentages of both large and medium trees on the landscape by the end of the second decade.

On the Sawtooth National Forest, all alternatives increase the large trees from the current condition by the second decade. Alternative 3, then Alternative 4 put the highest percentage of large trees on the landscape. These alternatives are followed by Alternative 5, then Alternative 6, and then Alternative 2, all of which are intermediate in their abilities to put large trees on the landscape. Alternatives 7 and 1B put the least percentage of acreage into the large tree size class. Regarding medium trees, all alternatives increase them relative to the current condition. Alternative 4 does the best job, followed in descending order by Alternatives 3 and 2, 5, 1B, 6, and 7. Overall, Alternatives 3 and 4 would do the best jobs of putting the highest percentages of both large and medium trees on the landscape by the end of the second decade. The Wilderness does not add to the large tree size class; it is less than the current condition.

Tables V-116 and V-117 present the values for large and medium trees, respectively, for the fifth decade.

Table V-116. Percentage of Total Forested Acres of Large Trees by Alternative in Fifth Decade

National Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Wilderness
Payette	28.1	33.5	33.4	31.8	27.7	29.5	31.4	27.5
Boise	21.8	24.6	25.5	23.6	20.1	23.4	24.1	N/A
Sawtooth	23.2	26.1	27.4	23.5	24.6	23.5	24.6	10.3

Table V-117. Percentage of Total Forested Acres of Medium Trees by Alternative in Fifth Decade

National Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Wilderness
Payette	26.1	26.2	28.1	29.7	24.8	28.9	25.7	33.6
Boise	28.0	35.7	35.5	38.4	33.4	37.8	30.2	N/A
Sawtooth	27.3	27.2	29.4	30.3	29.4	32.0	25.7	51.5

After 5 decades, all alternatives increase the large trees on the landscape, for each Forest. Alternatives 2 and 3 provide the best opportunity for putting large trees on the landscape on the Payette National Forest. This ranking agrees with the earlier analysis that included these two alternatives as best meeting the DCs for large trees. These alternatives are followed in descending order by Alternatives 4 and 7, 6, 1B, and 5. It is interesting to note that the wilderness acres are less than Alternative 5. The largest amounts of acreage in the Wilderness are PVGs 7 (30.3 percent of total wilderness acres) and 11 (19.6 percent of total wilderness acres). These are mixed 2 fire regimes, which tend to burn over large acreages and do not have the productivity to produce large trees the way some of the other PVGs (e.g., 2, 5, and 6) can. For medium trees, Alternative 4 produces the largest acreage in this class, followed in descending order by Alternatives 6, 3, 2, 7, 1B, and 5. Overall, Alternative 4, then Alternative 3 produce the largest amounts of both large and medium trees by the end of the fifth decade.

On the Boise National Forest after 5 decades, Alternative 3 provides the best opportunity for putting large trees on the landscape. This finding agrees with the earlier analysis that had this alternative as best meeting the DCs for large trees. Alternative 3is followed in order by Alternatives 2, 7, 4 and 6, 1B, and finally 5. Alternative 4 produces the largest acreage in the medium tree class, followed in order by Alternatives 6, 2 and 3, 5, 7, and 1B. Overall, Alternatives 3 and 2 produce the largest amounts of both large and medium trees by the end of the fifth decade.

On the Sawtooth National Forest after 5 decades, Alternative 3 provides the best opportunity for putting large trees on the landscape. This finding agrees with the earlier analysis that had this alternative as best meeting the DCs for large trees. This alternative is followed by Alternative 2, then Alternatives 5 and 7, then Alternatives 4 and 6, and last by Alternative 1B. It is interesting to note that the wilderness acres are less than Alternative 5. The largest amounts of acreage in the Wilderness are PVGs 7 (27.8 percent of total wilderness acres), PVG 10 (26.9 percent of total wilderness acres), and PVG 11 (21.7 percent of total wilderness acres), all of which are mixed 2 or lethal fire regimes, which burn over large acreages and do not have the productivity to produce large trees the way some of the other PVGs (e.g., 2, 5, and 6) can. For medium trees, Alternative 6 produces the largest acreage in this class, followed by Alternative 4, then Alternatives 3 and 5, then Alternatives 1B and 2, and last by Alternative 7. Overall, Alternatives 3 and 5 produce the largest amounts of both large and medium trees by the end of the fifth decade.

Tables V-118 and V-119 display the results for large and medium trees, respectively, in the tenth decade.

Table V-118. Percentage of Total Forested Acres of Large Trees by Alternative in Tenth Decade

National Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Wilderness
Payette	44.9	51.4	55.3	53.7	42.3	51.4	46.2	54.8
Boise	36.7	46.2	50.2	51.6	40.2	50.5	38.5	N/A
Sawtooth	34.5	37.4	42.2	42.1	43.1	37.9	30.2	44.8

Table V-119. Percentage of Total Forested Acres of Medium Trees by Alternative in Tenth Decade

National Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Wilderness
Payette	28.9	23.9	26.5	30.6	32.1	30.1	26.8	22.5
Boise	36.1	28.1	30.0	32.8	38.4	32.4	30.7	N/A
Sawtooth	28.5	26.1	28.9	28.8	30.3	38.3	24.9	38.2

After the tenth decade, the spread between the alternatives becomes larger than it was in earlier decades for the Payette National Forest. The acreage of large trees in the Wilderness also becomes much larger, more in line with the higher alternatives. Alternative 3 would put the most large trees on the landscape after the tenth decade, followed by Alternative 4, Alternatives 2 and 6, Alternative 7, Alternative 1B, and Alternative 5. For the medium trees, Alternative 5 would put the most on the landscape, followed by Alternative 4, Alternative 6, Alternative 1B, Alternative 7, Alternative 3, and Alternative 2. Overall, Alternatives 4 and 6 would put the highest amounts of large and medium trees on the landscape after the tenth decade.

On the Boise National Forest, after the tenth decade, the spread between the alternatives becomes larger than it was in earlier decades. Alternative 4 would put the most large trees on the landscape after the tenth decade, followed by Alternative 6, Alternative 3, Alternative 2, Alternative 5, Alternative 7, and Alternative 1B. For the medium trees, Alternative 5 would put the most on the landscape, followed by Alternative 1B, Alternative 4, Alternative 6, Alternative 7, Alternative 3, and Alternative 2. Overall, Alternative 4 would put the highest amounts of large and medium trees on the landscape after the tenth decade.

On the Sawtooth National Forest, after the tenth decade, the spread between the alternatives becomes larger than it was in earlier decades. The acreage of large trees in the Wilderness also becomes much larger, more in line with the higher alternatives. Alternative 5 would put the most large trees on the landscape after the tenth decade, followed by Alternatives 3 and 4, Alternative 6, Alternative 2, Alternative 1B, and Alternative 7. For the medium trees, Alternative 6 would put the most on the landscape, followed by Alternative 5, Alternatives 3 and 4, Alternative 1B, Alternative 2, and Alternative 7. Overall, Alternative 5, then Alternatives 3, 4, and 6 would put the highest amounts of large and medium trees on the landscape after the tenth decade.

Synthesis of Results - Considering all the above factors, across the Ecogroup area, Alternatives 3 and 4 would likely provide the most snags and coarse wood in the medium and large size classes. Alternative 3 dominates more in the earlier decades, and further out Alternative 4 becomes the dominant alternative for the future recruitment pool. A variety of decay classes should also prevail under these alternatives over the long term with improvements in ecosystem processes and functions.

These results are not surprising given that these alternatives were designed around the mean of HRV. When considering only the large trees, Alternative 3 is the best alternative, followed by Alternative 4, then Alternative 2. Alternative 1B is generally the worse for large trees, followed by Alternative 5, then Alternative 7. Alternatives 2 and 6 are intermediate. This is generally in line with the desired conditions for these alternatives. One exception is Alternative 5 for the tenth decade on the Sawtooth National Forest, where this is the best alternative for large trees. Treatment levels in Alternative 5 were affected by the budget being constrained in the modeling process (see Appendix B). It is also possible that the mix of MPCs on the Sawtooth does not accurately reflect the DC for the alternative; therefore, more larger trees are produced than required by the DC. For medium trees, there is a lot more variability between the Forests in the separate decades, so it is harder to draw conclusions.

It is assumed that if snags and coarse woody debris elements are sustained in a variety of size classes and species on the landscape that they would decay differentially depending on PVGs and localized site conditions, thus providing for a variety of decay classes. One important difference to note, however, is the rate at which the different alternatives may reach levels within the DCs. Alternatives such as 4 would rely primarily on ecological processes to achieve higher levels of large trees, hence large snags and coarse wood. The same would hold true in the designated Wilderness areas. Alternative 3 may reach DCs quicker due to restoration activities such as thinning and the use of fire as management tools. These activities are designed to release trees from competition, thus enabling them to reach large tree sizes faster than ecological processes alone. Insects, disease and fire would all affect the creation and longevity of snags and coarse woody debris. These processes and how they vary by alternative are discussed in further detail in the *Vegetation Hazard* section of this Chapter. Although effects would vary by alternatives, many of these effects would show large amounts of spatial variability across the landscape. It should be pointed out that from the current condition, all alternatives increase the large trees over time, while medium trees fluctuate more. The differences in the alternatives result from the relative amounts that large trees are increased on the landscape.

Non-forested Vegetation - Comparison with Desired Conditions over Time

Non-forested vegetation was modeled using the Vegetation Dynamics Development Tool (VDDT), which was designed to project changes in vegetation composition and structure over time for use in landscape-level analyses. Additional information about the VDDT model is available in Appendix B.

For each alternative, four questions relating to non-forested vegetation were under consideration. First, what mix of structural stages is likely to occur over time within each vegetation type? Second, what level of management activities is appropriate to achieve desired condition? Third, how is attainment of DC affected if chemical treatment and/or wildland fire use is unavailable? Fourth, what are the effects on structural stages as a result of wildfire and how does this influence vegetation hazard? The fourth question is covered in more detail in the *Vegetation Hazard* section.

Four non-forested vegetation types were recognized on the Mountain Home District of the Boise National Forest and eleven were recognized on the Sawtooth National Forest. Within each vegetation type, between four and eleven structural stages were represented. Modeling was not completed on the Payette National Forest and the remainder of the Boise National Forest due to the low number of acres and small patch sizes of non-forested vegetation in the types modeled.

The effects of each alternative are examined using a similar approach to that used for the current condition. The results of a mathematical comparison are used to determine whether or not the modeled canopy cover and size classes deviate from the DC values. This was analyzed for all three canopy/size classes (four classes for pinyon-juniper) simultaneously; assisting with the determination of whether or not the entire range of canopy/size classes reach a desired range, or if the differences could be attributed to chance alone. This was examined for the first, fifth, tenth, and fifteenth decades after plan implementation, due to the shorter successional times for these types when compared with forested vegetation, and the more frequent temporal fluctuations that result from disturbances.

Boise National Forest - Table V-120 represents the comparison of the model results with the DC for each alternative after the first decade (10 years).

Table V-120. Comparison Results Comparing Modeled Outputs of all Canopy Cover Classes at the End of the First Decade with Desired Conditions

Vegetation Type	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Mountain Big Sagebrush	Out	**In**	Out	**In**	Out	Out	**In**
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	Out	Out	Out	Out	Out	Out	Out
Mountain Big Sagebrush with Snowberry	Out	Out	Out	Out	Out	Out	Out
Mountain Big Sagebrush with Bitterbrush	Out	**In**	Out	Out	Out	**In**	**In**

After 10 years, mountain big sagebrush is within DC for Alternatives 2, 4, and 7. Alternative 2 had the lowest deviation value, meaning it is the closest to its DC; followed by Alternative 7, then Alternative 4. Mountain big sagebrush with bitterbrush reaches DC for Alternatives 2, 6, and 7. Alternative 2 had the lowest deviation value, again indicating it is the closest to its DC; followed by Alternative 7, then Alternative 6, although in this case, all three values were quite similar. The other two vegetation types do not reach DC in the first decade for any alternative.

As discussed, the DCs were developed around a range of HRV. The alternatives were therefore analyzed to see whether any were within the mid-range of HRV for non-forest conditions after 10 years. HRV is the anchor that ties the alternatives together and best reflects the functioning of biophysical parameters. It is also a way to compare alternatives as each one has a different DC. As mountain big sagebrush contains 91 percent of the total non-forested acreage, it was the only type analyzed. After the first decade, only one alternative is within the mid-range of HRV; Alternative 4. Incidentally, this is also the DC for Alternative 4.

Table V-121 displays the results for the fifth decade of whether or not the modeled canopy covers deviate from the DC values.

Table V-121. Comparison Results Comparing Modeled Outputs of all Canopy Cover Classes at the End of the Fifth Decade with Desired Conditions

Vegetation Type	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Mountain Big Sagebrush	**In**	**In**	**In**	**In**	**In**	Out	**In**
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	**In**	**In**	**In**	Out	**In**	**In**	**In**
Mountain Big Sagebrush with Snowberry	Out	Out	Out	Out	Out	**In**	In
Mountain Big Sagebrush with Bitterbrush	**In**	***In**	**In**	**In**	Out	**In**	**In**

*In means that all canopy cover classes are within the range of DC.
*Out means that vegetation type is no longer within the DC, but was in a previous decade.

Obviously, many more of the vegetation types under the different alternatives achieve DC by the end of the fifth decade. Alternative 7 reaches the DC for all four vegetation types. Alternatives 1B, 2, and 3 reach DC for three of the vegetation types, including mountain big sagebrush, which contains most of the acreage. Alternative 6 also reaches DC for three of the vegetation types, although mountain big sagebrush with the majority of acres is not one of them. Alternatives 4 and 5 achieve DC in two vegetation types, both of which include mountain big sagebrush. In ranking the alternatives, Alternative 7 best achieves DC (based on lowest deviation values), then Alternative 2, then Alternative 1B, followed by Alternative 3. Alternative 5 would come next as having the lowest values for the two types with the most acreage, then Alternative 4. Alternative 6 does meet DC for three types, but not for the major type in terms of acreage. For this reason, it is ranked as last.

As discussed, the DCs were developed around a range of HRV. The alternatives were therefore analyzed to see whether any were within the mid-range of HRV for non-forested conditions after 50 years. As mountain big sagebrush contains 91 percent of the total non-forested acreage, it was the only type analyzed. After the fifth decade, only two alternatives are within the mid-range of HRV, Alternatives 4 and 3. This coincides with the fact that these two alternatives were designed to meet the mid-range of HRV. The other alternatives, however, are not mathematically very far away from meeting the mid-range of HRV.

In the tenth decade, Alternative 7 meets the DC for all four vegetation types, as does Alternative 2. Alternatives 1B and 5 meet the DC for three of the vegetation types, including mountain big sagebrush. Alternatives 3 and 6 meet the DC for only two vegetation types, neither of which includes mountain big sagebrush, and Alternative 4 only meets the DC for the mountain big sagebrush with chokecherry, serviceberry and rose type. Some of the PVGs that were within the DC in previous decades have now fallen out. It is typical for these types to have fluctuations over time, and this trend is explored in more detail in the Temporal Fluctuations section. As with any model, the further out the results are projected, the less reliable are the outputs.

Comparing the mountain big sagebrush vegetation with the mid-range of HRV after ten decades, none of the alternatives is within the mid-range of HRV. When considering all four of the vegetation types, all alternatives are within the mid-range of HRV for the mountain big sagebrush with chokecherry, serviceberry and rose and all of them are within the mid-range for mountain big sagebrush with snowberry, except Alternative 4. Looking at the cumulative values across all four vegetation types dominated by mountain big sagebrush independent of habitat/community type, Alternative 7 would be the closest to the mid-range of HRV across all four types, then Alternative 3, then Alternative 1B, then Alternative 2, followed by Alternatives 5 and 6. The values between alternatives however, have a small range between them. Alternative 4 is the farthest from mid-range of HRV; primarily due to very high values in both the low and high canopy cover classes.

After the results are projected out 150 years, model reliability goes down. However, Alternative 7 remains consistent in meeting the DC for all vegetation types, as does Alternative 2. These alternatives are followed by Alternatives 1B, 3, 5, and 6. Alternative 4 does not meet DC for any vegetation type.

Synthesis of Results - Further analysis was conducted to determine in what decade Alternatives first reach DCs. Alternative 7 meets the DC for all four vegetation types by the end of the second decade. Alternative 2 meets the DC for all four vegetation types by the end of the sixth decade. Of the remaining alternatives, Alternatives 1B, 2, 3, 4, and 5 meet the DC for mountain big sagebrush, the most prevalent type, at the end of the fifth decade. Alternatives 1B, 2, 3, and 6 meet the DCs for the most vegetation types by the end of the fifth decade, although it should be noted that Alternative 6 does not meet DC for the most prevalent type, mountain big sagebrush.

In summary, it appears that Alternative 7 is the best alternative for meeting its desired condition for all vegetation types and in the shortest amount of time on the Boise National Forest. Alternative 2 closely follows. The remaining alternatives would be ranked in the following manner for meeting the desired conditions for the most vegetation types in the shortest amount of time: Alternative 1B, 3, and 5 all group together, followed by Alternatives 4 and 6. For falling the closest to HRV, Alternative 4 does the best in the earlier decades (thus meeting its DC also). However, it is not sustainable as canopy covers continue to increase until a large wildfire event occurs, thus increasing the amount in the low canopy cover class. Alternative 3 is the overall best for meeting HRV, which is what this alternative is designed to do, followed by Alternative 7. It should be noted that the variations between alternatives, when considering HRV, were usually quite small.

Sawtooth National Forest - Table V-122 represents the comparison of the model results with the DC for each alternative after the first decade (10 years).

Table V-122. Comparison Results on the Sawtooth National Forest Comparing Modeled Outputs of all Canopy Cover Classes at the End of the First Decade with Desired Conditions

Vegetation Type	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Mountain Big Sagebrush	Out	**In**	**In**	Out	**In**	**In**	**In**
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	Out	**In**	**In**	**In**	Out	**In**	**In**
Mountain Big Sagebrush with Snowberry	Out	Out	Out	Out	Out	***In**	Out
Mountain Big Sagebrush with Bitterbrush	Out	Out	Out	Out	Out	Out	Out
Basin Big Sagebrush	Out	**In**	**In**	**In**	Out	**In**	**In**
Low Sagebrush	Out	Out	Out	Out	Out	Out	Out
Wyoming Big Sagebrush	Out	**In**	Out	Out	Out	Out	**In**
Climax Aspen	Out	Out	Out	Out	Out	Out	Out
Pinyon-Juniper	**In**	Out	Out	Out	**In**	Out	Out

*In means that all canopy cover classes are within the range of DC.

After 10 years, mountain big sagebrush is within DC for Alternatives 2, 3, 5, 6, and 7. Alternative 6 had the lowest deviation value, meaning it is the closest to its DC; followed by Alternatives 7, 2, 5, then Alternative 4. Mountain big sagebrush with chokecherry, serviceberry and rose is within DC for Alternatives 6, 3, 7, 2, and 4, ranked in order of increasing deviation values. Mountain big sagebrush with snowberry is within the DC for all canopy covers in Alternative 6. Mountain big sagebrush with bitterbrush and climax aspen do not reach DC for any alternative. Wyoming big sagebrush meets the DC for Alternatives 2 and 7, with 2 having the lower deviation value. Pinyon-juniper meets the DC for Alternatives 1B and 5, with Alternative 5 having the lowest value.

Low sagebrush does not meet the DC for any alternative; however if the low and medium canopy cover classes are combined, it does approach the DC. As discussed in the current condition section, mapping of initial conditions may not have correctly portrayed the current condition. Furthermore, the modeling may not have accurately depicted succession in low sagebrush. This will be discussed in more detail below.

Overall, Alternatives 2, 6, and 7 meet the DC for the greatest amount of vegetation types after the first decade.

As discussed, the DCs were developed around a range of HRV. The alternatives were, therefore, analyzed to see whether any were within the mid-range of HRV for non-forested conditions after 10 years. HRV is the anchor that ties the alternatives together and best reflects the functioning of biophysical parameters. It is also a way to compare alternatives as each one has a different DC. As mountain big sagebrush contains 47 percent of the total non-forested acreage, mountain big sagebrush with chokecherry, serviceberry, and rose is 26 percent of the total non-forested acreage, and climax aspen is 7 percent (for a total of 80 percent), the analysis was conducted for these types.

After the first decade, four alternatives are mathematically within the mid-range of HRV for mountain big sagebrush, ranked by lowest values (closest to HRV) to the highest, Alternatives 1B, 3, 7, and 5. Mountain big sagebrush with chokecherry, serviceberry, and rose has 6 alternatives within HRV after one decade. They rank in the following manner: Alternatives 5, 3, 7, 1B, and 2. For climax aspen, none of the outcomes after a decade falls within the range of HRV.

Table V-123 displays the results for the fifth decade of whether or not the modeled canopy covers deviate from the DC values.

Table V-123. Comparison Results on the Sawtooth National Forest Comparing Modeled Outputs of all Canopy Cover Classes at the End of the Fifth Decade with Desired Conditions

Vegetation Type	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Mountain Big Sagebrush	**In**	***In**	**In**	**In**	**In**	**In**	**In**
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	**In**	**In**	**In**	**In**	**In**	*Out	**In**
Mountain Big Sagebrush with Snowberry	Out	*Out	**In**	Out	Out	*Out	**In**
Mountain Big Sagebrush with Bitterbrush	**In**	***In**	*Out	**In**	**In**	Out	**In**
Basin Big Sagebrush	**In**	**In**	**In**	**In**	**In**	**In**	**In**
Low Sagebrush	Out	Out	Out	Out	Out	Out	Out
Wyoming Big Sagebrush	Out	*Out	*Out	*Out	Out	*Out	**In**
Climax Aspen	Out	*Out	**In**	**In**	Out	**In**	*Out
Pinyon-Juniper	**In**	Out	Out	Out	**In**	Out	*Out

*In means that all canopy cover classes are within the range of DC.
*Out means that vegetation type is no longer within the DC, but was in a previous decade.

Obviously, many more of the vegetation types under the different alternatives achieve DC by the end of the fifth decade. Mountain big sagebrush and basin big sagebrush reach the DC in every alternative, ranked Alternative 2, 7, 1B, 5, 4, 6, and 3 for mountain big sagebrush, and Alternative 2, 7, 5, 6, 1B, 4, and 3 for basin big sagebrush. Mountain big sagebrush with chokecherry serviceberry, and rose meets the DC for all alternatives except Alternative 6. These are ranked Alternative 7, 2, 3, 1B, 5, and 4. Mountain big sagebrush with snowberry meets the DC for Alternatives 3 and 7, ranked accordingly. Climax aspen reaches the DC in Alternatives 4, 6, and 3, also ranked accordingly. For pinyon-juniper, Alternative 5 has the lowest deviation value, followed by Alternative 1B. Wyoming big sagebrush has only one alternative that is within the DC after 5 decades, Alternative 7. Outs marked with a * were previously in DC and now have fallen outside the range. It is natural for there to be fluctuations over time, and this will be explored in more detail.

Low sagebrush does not meet the DC for any alternative; however, if the low and medium canopy cover classes are combined, it does approach the DC. As discussed in the current condition, mapping of initial conditions may not have correctly portrayed the current condition. Furthermore, the modeling may not have accurately depicted succession in low sagebrush. This will be discussed in more detail below.

Overall, Alternative 7 meets the DC for the greatest amount of vegetation types after the fifth decade, followed in order by Alternatives 1B, 3, 4, and 5.

As discussed, the DCs were developed around a range of HRV. The alternatives were therefore analyzed to see whether any were within the mid-range of HRV for non-forested conditions after 50 years. As mountain big sagebrush contains 47 percent of the total non-forested acreage, mountain big sagebrush with chokecherry, serviceberry, and rose is 26 percent of the total non-forested acreage, and climax aspen is 7 percent (for a total of 80 percent), the analysis was conducted for these types.

After the fifth decade, all alternatives are within the mid-range of HRV for mountain big sagebrush. They rank in the following order: Alternatives 6, 4, 2, 1B, 3, 7, and 5. All but Alternative 6 are within HRV for the mountain big sagebrush with chokecherry, serviceberry, and rose type, and are ranked in order as Alternative 5, 1B, 3, 7, 2, and 4. Climax aspen had 5 alternatives within HRV after 5 decades; and are ranked in order as Alternative 4, 7, 3, 2, and 6.

In the tenth decade, Alternatives 7 and 2 meet the DC for the most vegetation types. Alternatives 5 and 6 meet the DC for five of the vegetation types, although Alternative 6 does not include mountain big sagebrush, the most abundant. Alternatives 1B and 3 meet the DC for four of the vegetation types and Alternative 4 for three of the vegetation types; only 1B, however, includes mountain big sagebrush. Some of the PVGs that were within the DC in previous decades have now fallen out. It is natural for there to be fluctuations over time, and this will be explored in more detail. As with any model, the further out the results are projected, the less reliable are the outputs.

Comparing the mountain big sagebrush vegetation with the mid-range of HRV after ten decades, none of the alternatives are within the mid-range of HRV. When considering the mountain big sagebrush with chokecherry, serviceberry and rose, all alternatives are within the mid-range for HRV, and are ranked as following: Alternative 4, 2, 1B, 3, 5, 7 and 6. Climax aspen also has all alternatives within the mid-range of HRV, with Alternative 7 being the closest, followed by Alternative 3, 2, 4, 6, 5, and 1B. Looking at the cumulative values across all four vegetation types dominated by mountain big sagebrush independent of habitat/community type, Alternative 1B and 3 are the only ones within the mid-range of HRV across all four types.

Again, as these results are projected out 150 years, model reliability goes down. However, Alternative 7 remains consistent in meeting the DC for the most vegetation types, six of them. Alternative 6 also meets DC for the most vegetation types after fifteen decades; both of these alternatives include mountain big sagebrush as within the DC. Alternatives 2 and 3 meet the DC for five of the vegetation types, and both alternatives include mountain big sagebrush. Alternatives 4 and 5 meet the DC for four of the vegetation types; but Alternative 4 does not include the more abundant mountain big sagebrush. Alternative 1B meets the DC for only three of the vegetation types.

<u>Synthesis of Results</u> - Further analysis was conducted to determine in what decade Alternatives first reach DCs. Alternative 7 meets the DC for seven vegetation types by the end of the second decade. Pinyon-juniper later falls from the DC in Alternative 7, while climax aspen enters it after the third decade. Alternative 2 meets the DC for six of the vegetation types by the end of the second decade. Alternative 3 meets seven of the DCs by the end of the third decade. Alternative 6 meets the DC for six vegetation types by the end of the third decade, and meets DC for five by the end of the second decade. Alternative 4 meets six of them by the end of the third decade. Alternative 5 meets five of them after the second decade, while Alternative 1B meets the DC for three of the vegetation types by the end of the second decade

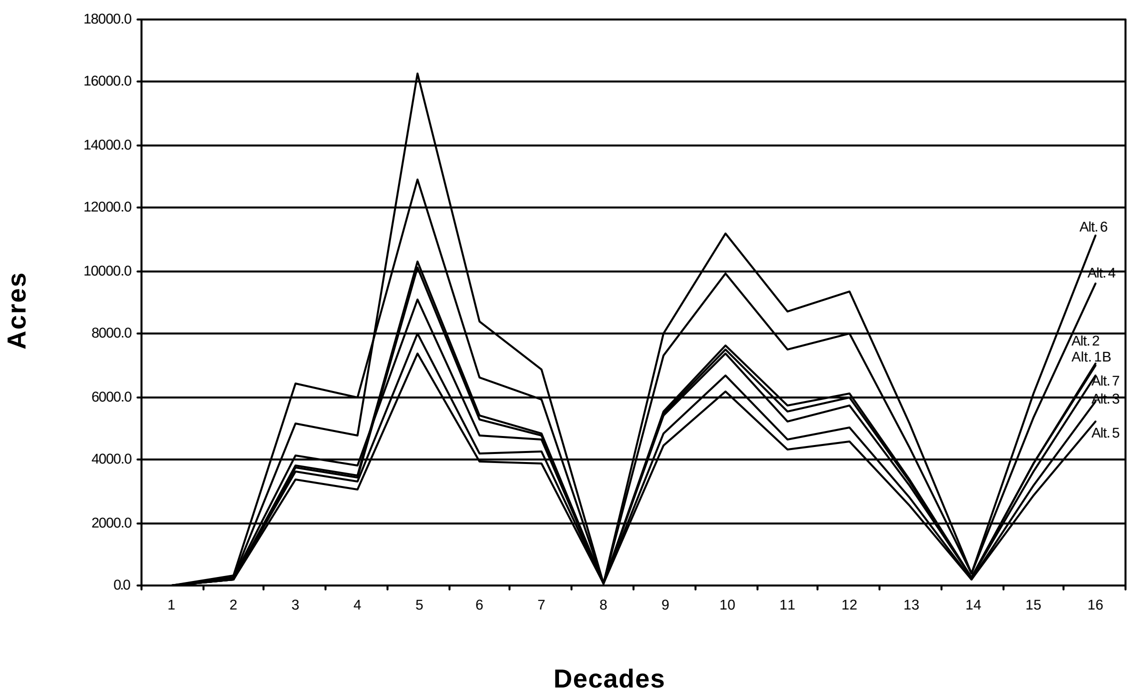
In summary, it appears Alternative 7 is the best alternative for meeting the DC for the most vegetation types in the shortest timeframes. Alternative 7 is followed in order by Alternatives 2, 6, 3, 5, 1B, and 4. For falling the closest to HRV, Alternatives 3, 7, and 1B appear to be the overall best, although it varies somewhat by sagebrush types and the climax aspen.

One thing to note is that Alternatives 5 and 1B appear to be the best alternatives for meeting the DCs for pinyon-juniper. The DCs for these alternatives required less acreage in the larger size classes than the DCs for other alternatives. Pinyon-juniper was modeled alone (when canopy cover is greater than 10 percent), and together with mountain big sagebrush or Wyoming big sagebrush that contained pinyon-juniper, but with less than 10 percent canopy cover of the pinyon-juniper. It was assumed that these were stands in the process of conversion to pinyon-juniper. Different probabilities were applied to the various structural stages in these mixed types as to whether they would continue on the sagebrush successional pathway, or if they would "jump" to the pure pinyon-juniper pathway, based on age class and canopy covers. The alternatives that appeared to minimize the conversion of either one of sagebrush types to pinyon-juniper (or maximized the conversion back to sagebrush from pinyon-juniper) were ranked in the following order (starting from the alternative that most minimized conversion): Alternatives 7, 3, 4, 2, 5, 1B, and 6. In this case, although Alternative 7 was the best alternative for minimizing conversion, it was not the best alternative for getting the pinyon-juniper on the landscape to the DC. There is almost an inherent conflict in the DC; it is difficult to increase size classes of juniper at the same time that it is being thinned through various treatments to allow for more sagebrush, grasses, and forbs. This modeling points out the importance of the habitat types at the project level and the need to design treatments that are appropriate for the habitat type. If the habitat type is pinyon-juniper, then having a more even distribution of tree size classes may be more appropriate. If the habitat type is sagebrush and it is early enough in the conversion process, then trying to get more sagebrush into the system, at the expense of pinyon-juniper, may be the appropriate course of action. This type of thinking is strongly encouraged for all vegetation types for implementation at project levels. This analysis merely provides a context for examining differences between alternatives at the landscape level.

Temporal Fluctuations - Plots of the acreage over time for each alternative, in each of the canopy cover classes of mountain big sagebrush were developed to see how each alternative responds over time to the modeled probabilities of treatments and/or disturbances. Mountain big sagebrush was used as it represents 91 percent of the total acreage mapped of non-forested vegetation for the Boise National Forest and 47 percent of the total acreage for the Sawtooth National Forest. Although not a majority on the Sawtooth National Forest, the other mountain big sagebrush vegetation types would have similar trends and results. Temporal fluctuations are also examined in part, for climax aspen and low sagebrush.

<u>Boise National Forest</u> **-** The acreage in the grass/forb class each decade fluctuates widely (Figure V-7).

Figure V-7. Acres over Time in Grass/Forbs for Mountain Big Sagebrush - Boise National Forest

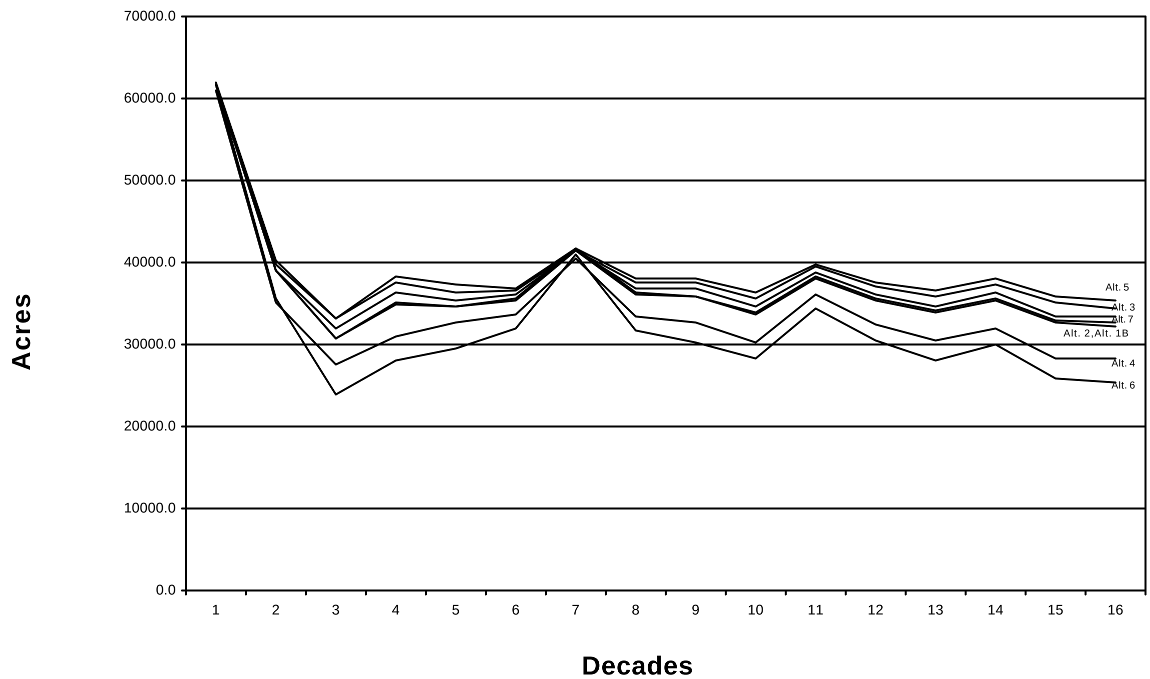


The only modeled disturbance that can move acres into this class is failed fire suppression. Therefore, these fluctuations are representative of the fluctuations in escaped wildfires. The lows are years with little to no wildfires, and the highs are the years with large amounts of acreage affected by failed fire suppression efforts. Although there is variation between the alternatives, the basic pattern from decade to decade is the same across the alternatives. This is because in the modeling, wildfire was introduced into every alternative at the same timeframe, based on past history of wildfires. The modeling objective was to look at the relative differences between alternatives both after a wildfire and based on differences in the current condition at the time the wildfire occurs; not to evaluate the timeframes at which a wildfire would occur. This difference would be based on the amounts of acres in the high or greater canopy cover class.

Alternative 6 has the overall highest levels in the grass/forb class, indicating this alternative would have the most acreage affected by failed fire suppression. This alternative is followed in order by Alternatives 4, 2 and 1B, 7, 3, and 5.

In the low canopy cover class, the current condition starts with 69 percent of the acres in this class, as is evident by Figure V-8.

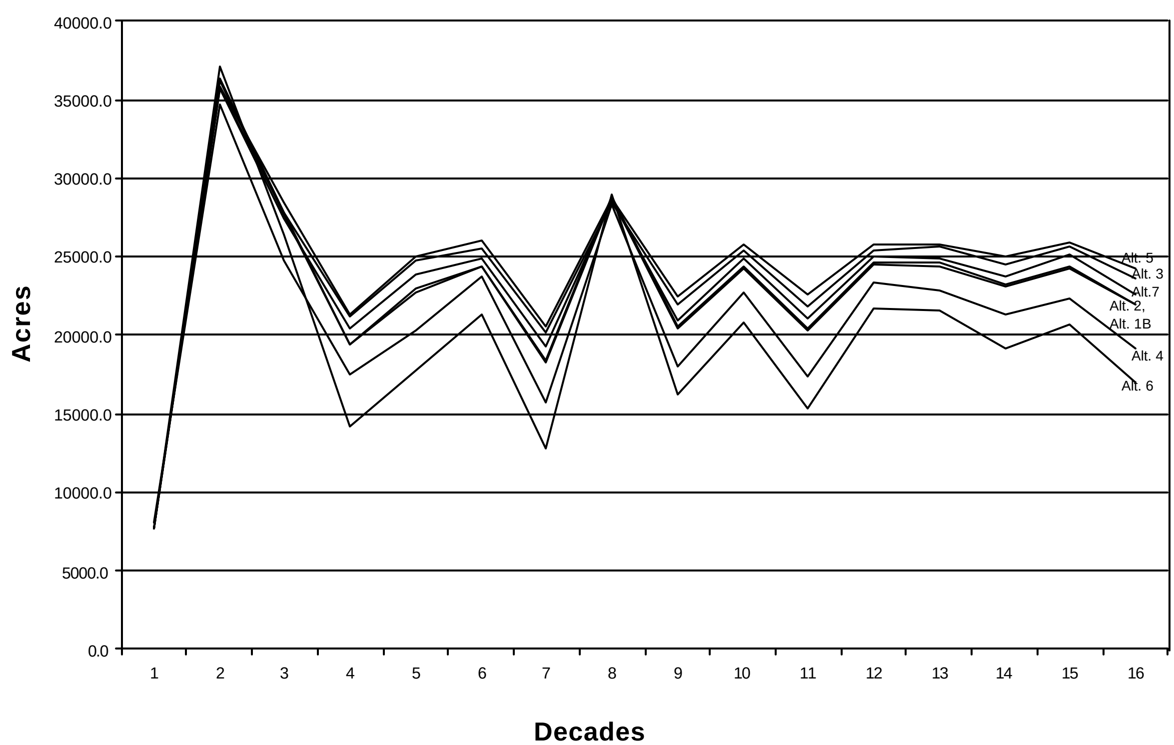
Figure V-8. Acres over Time in 0-10 Percent Canopy Cover Class for Mountain Big Sagebrush - Boise National Forest



By the third decade, these acres have dropped and appear to stabilize in the 30,000-40,000 range, which would be approximately 34-45 percent of the total acreage in mountain big sagebrush. Again, the alternatives all follow the same basic pattern of fluctuation, responding to similar cycles of succession and management treatments. The difference between the alternatives is in the levels of management treatments. There is some variation between them, with Alternative 5 generally maintaining the highest levels in this canopy cover class, followed by Alternatives 3 and 7. Alternatives 2 and 1B are similar, and follow Alternative 7. Alternatives 4 and 6 maintain the lowest amounts in the low canopy cover class.

Figure V-9 displays the fluctuations in the medium canopy cover class, which are greater than in the low canopy cover class. These acres start off low and make a large jump as the current condition moves into this class. At the eighth decade there is another peak, corresponding with a very low amount of acres in the grass/forb class (Figure V-7). The levels in this graph fluctuate roughly between 15,000 acres and 25,000 acres (excluding peaks and low points). This corresponds to approximately 17-28 percent of the total acres of mountain big sagebrush. Again, although there is variation between alternatives, they all follow the same basic patterns, reflecting differing levels of management treatments. The alternative with the highest acreages in the medium canopy cover class is Alternative 5, followed by 3, 7, 2, and 1B, with Alternatives 4 and 6 having the least amount of acres in this class.

Figure V-9. Acres over Time in 11-21 Percent Canopy Cover Class for Mountain Big Sagebrush - Boise National Forest



All alternatives in the high canopy class (Figure V-10) have very little variation between them, particularly beyond the thirteenth decade. The alternative with the largest peaks and lowest lows is Alternative 6, which relates to wildfire disturbance, as discussed with Figure V-7. Alternative 5 after 15 decades ends up with the most in the high canopy closure class, but the variance with other alternatives is minor. Comparing this Figure with Figure V-7, high canopy cover increases are usually preceded by an increase in grass/forbs, indicating that large acreages in higher canopy cover increase the chances of an escaped wildfire (failed fire suppression). The range is generally between 10,000 acres and 15,000 acres, except for the high peaks. This corresponds to about 11-17 percent of the total acreage of mountain big sagebrush.

Figure V-10. Acres over Time in 21-30 Percent Canopy Cover Class for Mountain Big Sagebrush Boise National Forest

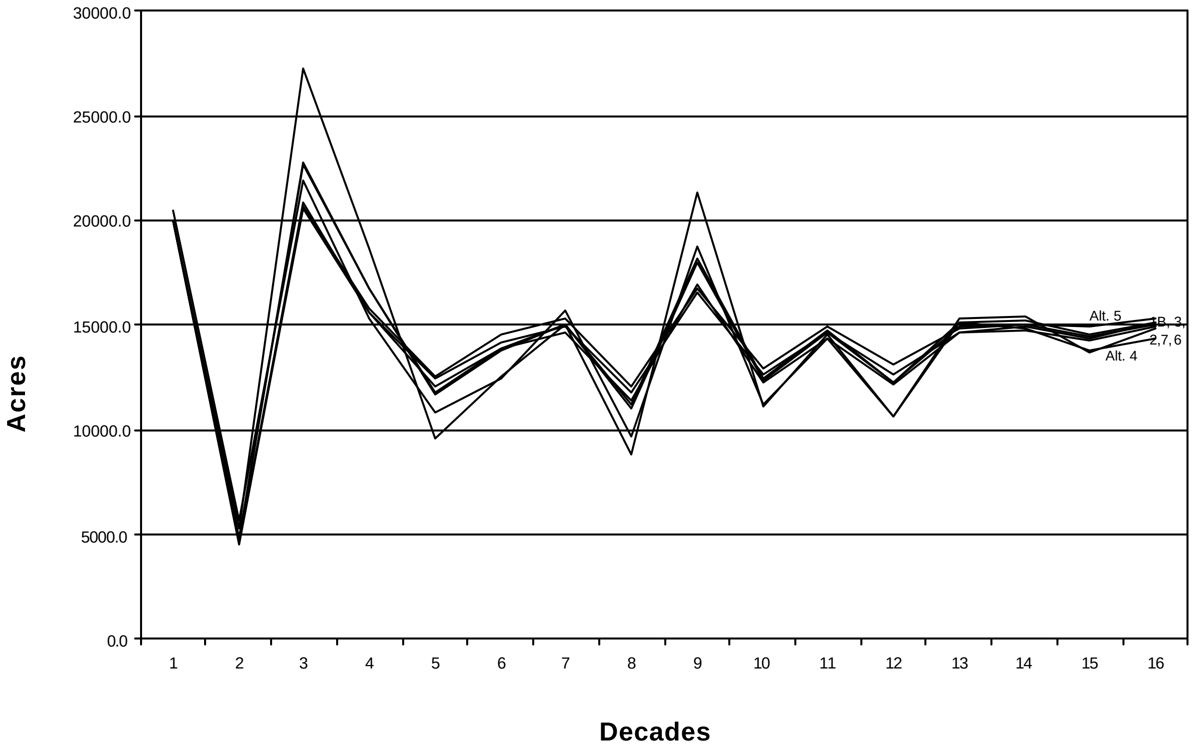
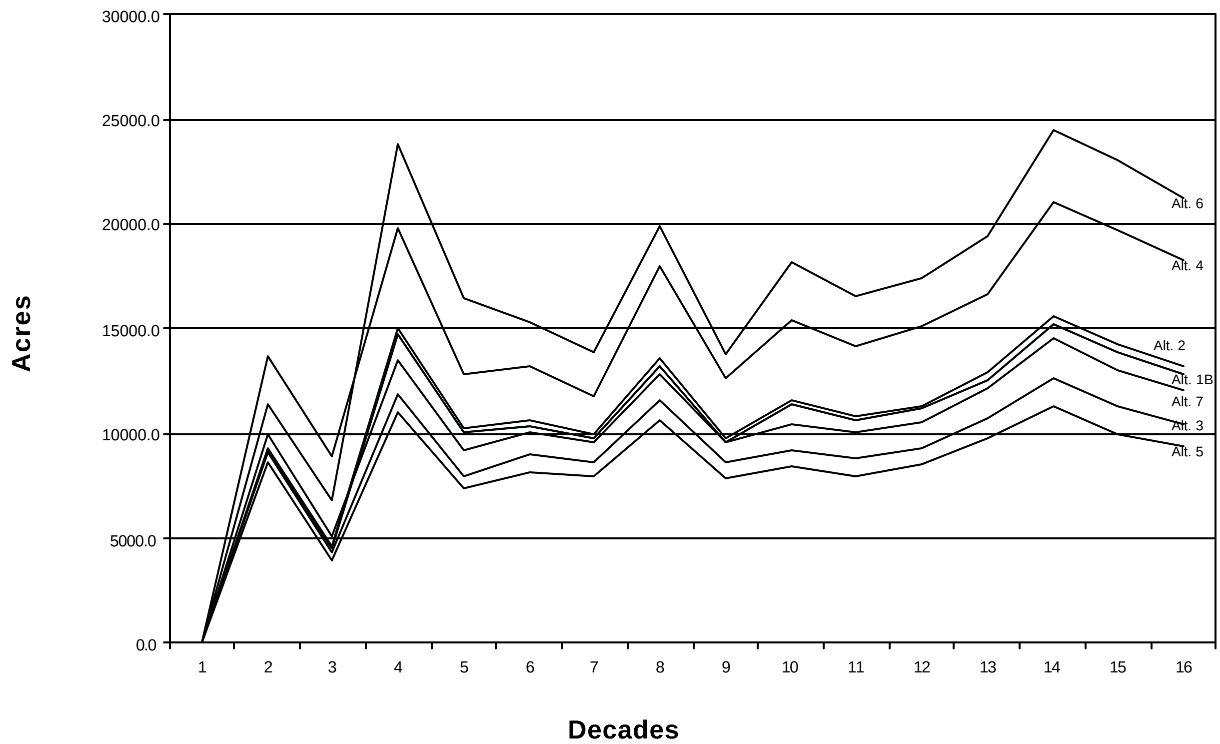


Figure V-11 displays more variation between the alternatives in the very high canopy cover class. Alternative 6 has the highest amount in the very high class, followed in order by Alternatives 4, 2, 1B, 7, 3, and 5. When compared with Figure V-7, it is apparent that as the very high canopy cover is at its highest, the following decade counters with a large increase in the grass/forb class, resulting from failed fire suppression. The current condition also has very little acreage in the very high canopy cover class; however, the VDDT model shows this class increasing in all alternatives. Although the relative ranking of alternatives fits well with the themes and proposed activities in each of these alternatives, it does appear as if certain parameters that were established in the model may be exaggerating overall increases in total amounts in the very high canopy cover class. It seems unlikely this class would increase so much for every alternative, given the current condition at this time. However, the effects of the Foothills Fire and other recent events could contribute to the current condition being exceptionally low. The range is generally between 8,000 acres and 13,000 acres, except for the high peaks for Alternatives 4 and 6. This corresponds to about 8-15 percent of the total acreage of mountain big sagebrush. When added with high canopy cover class from Figure V-10, this equals 19-32 percent. For Alternatives 4 and 6, the range of very high canopy cover class is around 13,000 to 23,000 acres, or 15-26 percent of the total acreage of mountain big sagebrush. When added with the high canopy cover class, the combined total is 26-43 percent of mountain big sagebrush with a canopy cover over 21 percent.

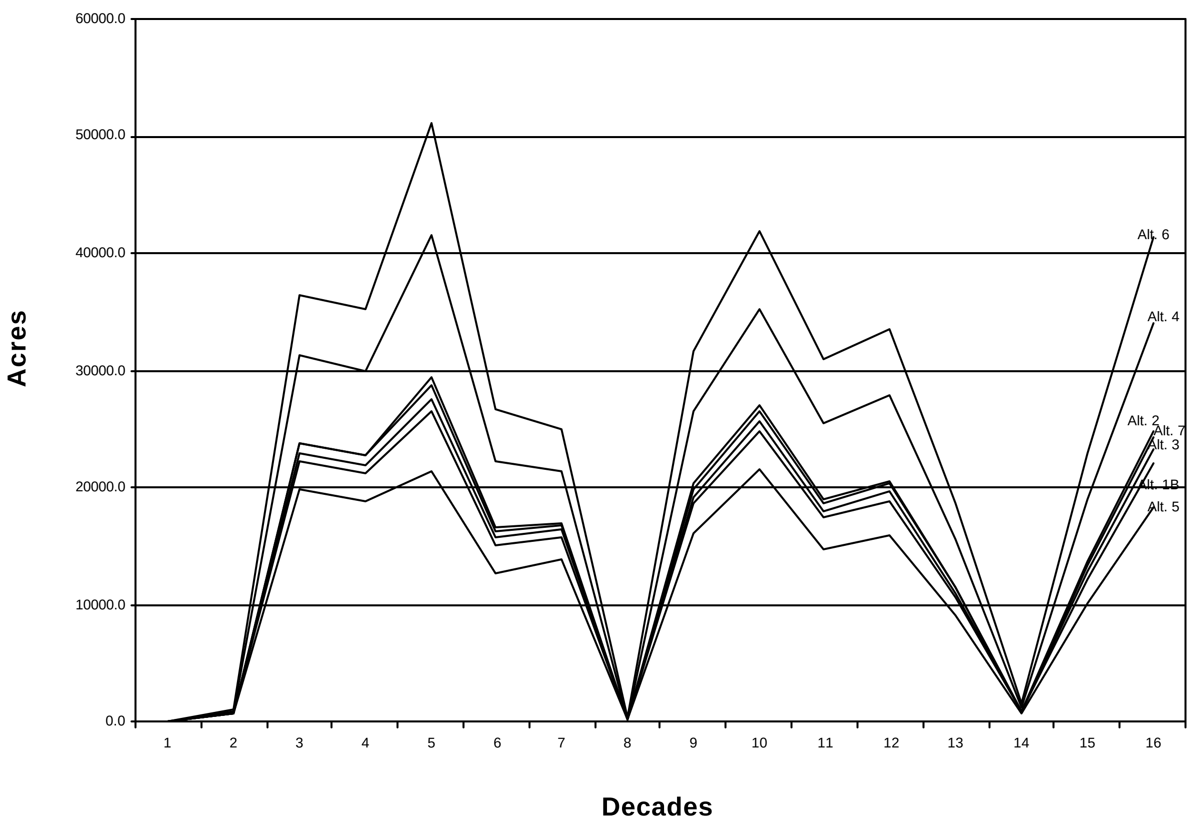
Figure V-11. Acres over Time in >31 Percent Canopy Cover Class for Mountain Big Sagebrush - Boise National Forest



<u>Sawtooth National Forest, Mountain Big Sagebrush</u> - Similar to the Boise National Forest, the acreage in the grass/forb class fluctuates widely each decade (Figure V-12). The only modeled disturbance that can move acres into this class is failed fire suppression. Therefore, these fluctuations are representative of the fluctuations in escaped wildfires (failed fire suppression). The lows are years with little to no wildfires, and the highs are years with large amounts of acreage affected by escaped wildfires. Again, the basic pattern from decade to decade is the same across the alternatives. This is because in the modeling, wildfire was introduced into every alternative at the same timeframe, based on past history of wildfires. The analysis objective was to look at the relative differences between alternatives, both after a wildfire and based on differences in the current condition at the time the wildfire occurs; not to evaluate the timeframes at which a wildfire would occur. This difference would be based on the amounts of acres in the high or greater canopy cover class.

Alternative 6 has the overall highest levels in the grass/forb class, indicating this alternative would have the most acreage affected by failed fire suppression. This alternative is followed in order by Alternatives 4, 2, 7, 3, 1B, and 5.

Figure V-12. Acres over Time in Grass/Forbs for Mountain Big Sagebrush - Sawtooth National Forest



In the low canopy cover class, the current condition starts with slightly over 100,000 of the acres, as is evident by Figure V-13. The seven alternatives fluctuate between 100,000-130,500 acres, which would be approximately 33-43 percent of the total acreage in mountain big sagebrush. The only exceptions would be Alternatives 4 and particularly Alternative 6, which drop below 100,000 acres in several decades, with corresponding increases of acres in the very high canopy cover classes. Again, the alternatives all follow the same basic pattern of fluctuation, responding to similar cycles of succession and management treatments. The difference between the alternatives is in the levels of management treatments. There is some variation between them, with Alternative 5 generally maintaining the highest levels in the low canopy cover class, followed by Alternatives 1B and 3. Alternatives 2 and 7 are similar and follow Alternative 3. Alternatives 4 and 6 maintain the lowest amounts in the low canopy cover class.

Figure V-13. Acres over Time in 0-10 Percent Canopy Cover Class for Mountain Big Sagebrush - Sawtooth National Forest

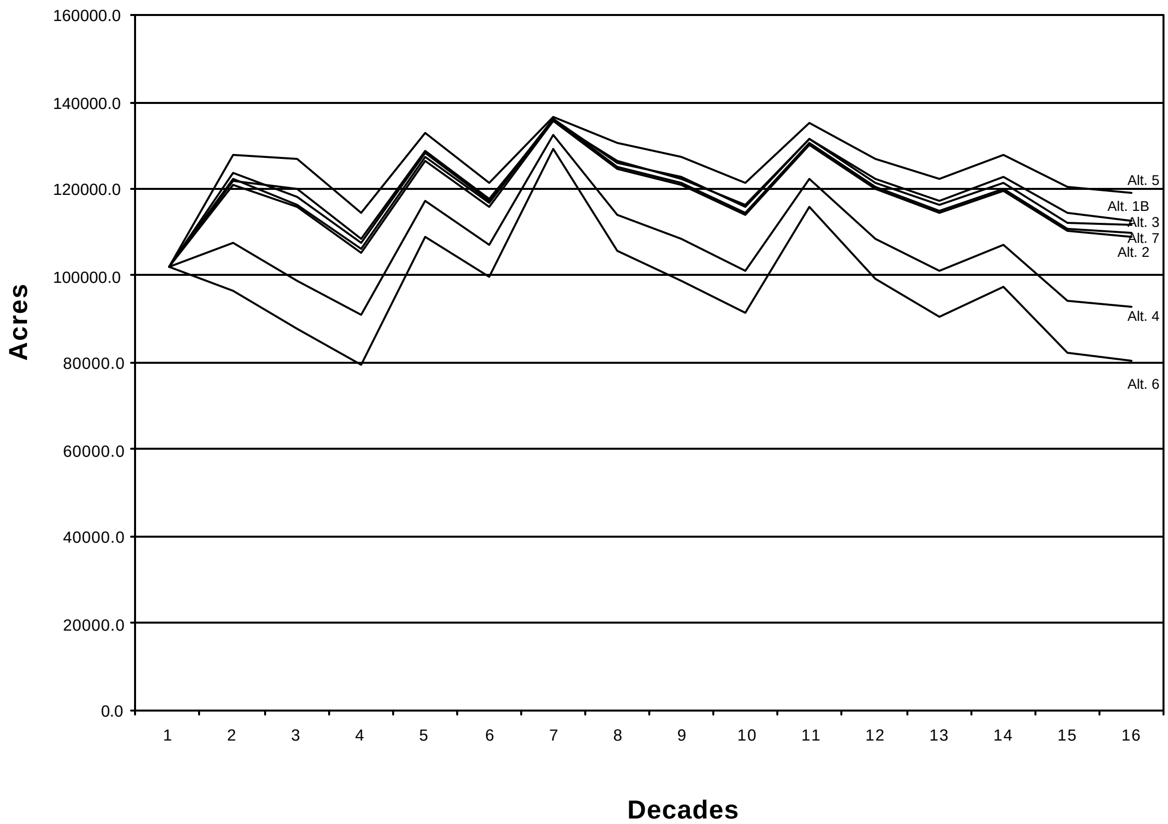
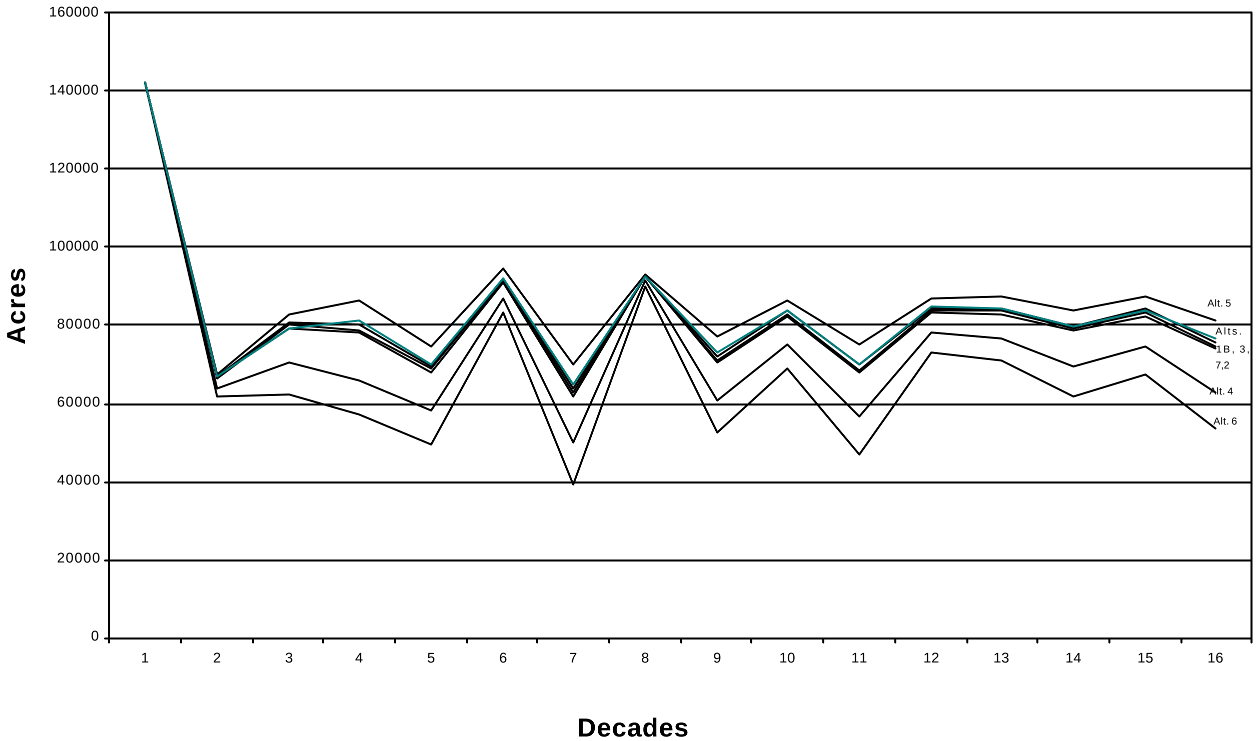


Figure V-14 displays the temporal changes in the medium canopy cover class, which starts with 47 percent of the total mountain big sagebrush acres in this class. By the second decade these acres have dropped off to 22 percent of the total mountain big sagebrush acres for all alternatives. After this decade, variation between alternatives becomes more apparent. All alternatives vary between 60,000-85,000 acres, in the range of 20-28 percent of the total mountain sagebrush acreage. Alternatives 4 and 6 do have some decades that drop below this range due to increasing amounts of acres in the very high canopy cover classes. Again, although there is variation between alternatives, they all follow the same basic patterns, reflecting differing levels of management treatments. The alternative with the highest levels in the medium canopy cover class is Alternative 5, followed by 1B, 3, 7, and 2, all grouped closely together. Alternatives 4 and 6 have the least amount of acres in this class.

Figure V-14. Acres over Time in 11-21 Percent Canopy Cover Class for Mountain Big Sagebrush - Sawtooth National Forest



All alternatives in the high canopy class have very little variation between them, as displayed by Figure V-15. The alternative with the largest peaks and lowest lows is Alternative 6, which relates to wildfire disturbance, as discussed with Figure V-12. Alternatives 5 and 1B after fifteen decades end up with the most acres in the high canopy closure class, but the variance with other alternatives is minor. When comparing this Figure with Figure V-12, high canopy cover increases usually precede increases in grass/forbs, indicating that large acreages in higher canopy covers increase the chances of an escaped wildfire (failed fire suppression). The range is generally between 40,000 acres and 60,000 acres, except for the high peaks. This corresponds to about 13-20 percent of the total acreage of mountain big sagebrush.

Figure V-15. Acres over Time in 21-30 Percent Canopy Cover Class for Mountain Big Sagebrush Sawtooth National Forest

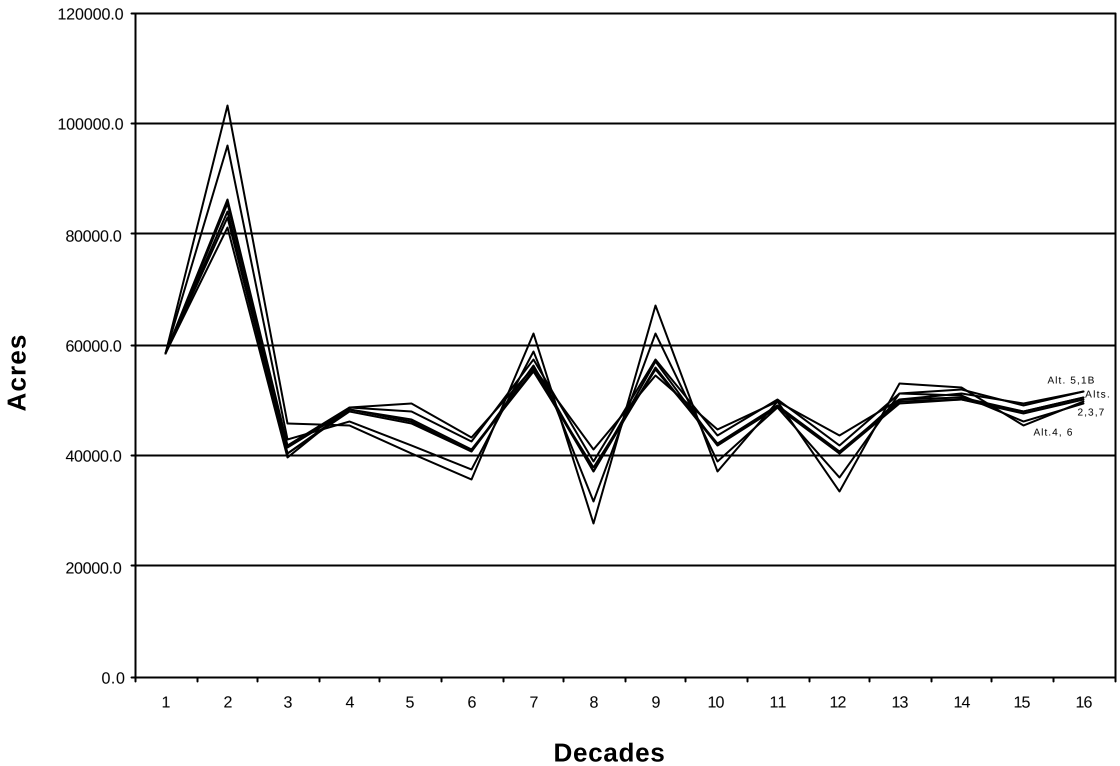
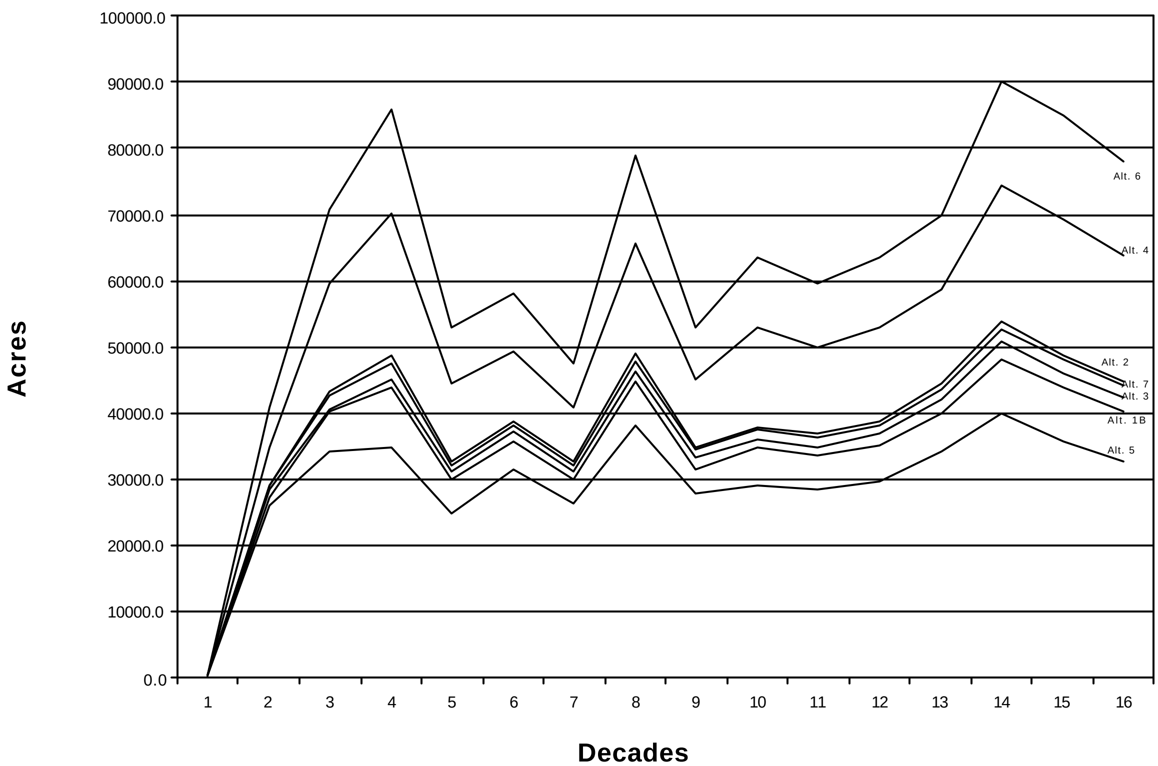


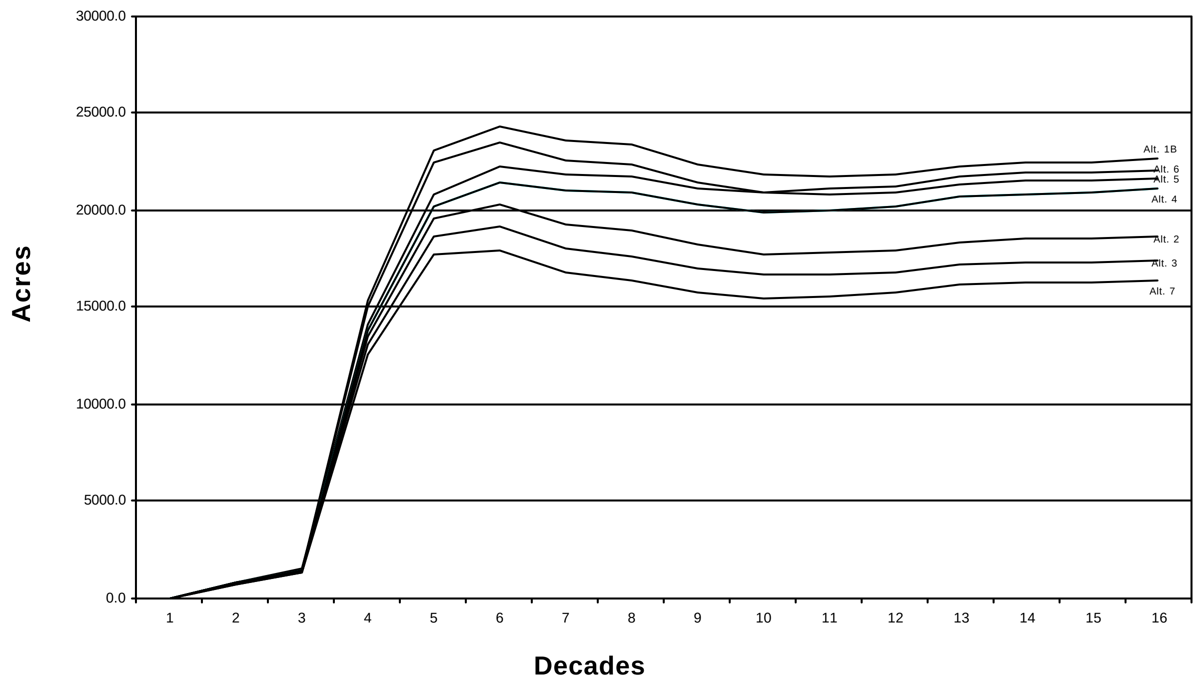
Figure V-16 displays more variation between the alternatives in the very high canopy cover class. Alternative 6 has the highest amount in the very high class, followed in order by Alternatives 4, 2, 7, 3, 1B, and 5. When compared with Figure V-12, it is apparent that after the very high canopy cover is at its highest, the following decade counters with a large increase in the grass/forb class, resulting from failed fire suppression. The current condition also has very low acreage in the very high canopy cover class; however, the VDDT model shows it increasing in all alternatives. Although the relative ranking of alternatives fits well with the themes and proposed activities in each of these alternatives, it does appear as if certain parameters that were established in the model may be exaggerating overall increases in the very high canopy cover class. It seems unlikely that it would increase so much for every alternative, given the current condition at this time. As the Sawtooth has not had recent large-scale fires such as the Foothills Fire on the Boise National Forest, it is unlikely that this is a result of recent disturbance events. Therefore, it does appear to be a function of the parameters set up in the modeling process, particularly given the large rise in acres at the first decade. However, it is still indicative of the differences between alternatives, reflecting increases in canopy covers at a landscape scale beyond certain threshold levels. The range is generally between 30,000 acres and 48,000 acres, for all alternatives except 4 and 6, which have higher peaks, and Alternative 5, which drops below 30,000 in some decades. This corresponds to about 10-16 percent of the total acreage of mountain big sagebrush. When added with high canopy cover class from Figure V-15, this equals 23-36 percent. For Alternatives 4 and 6, the range of very high canopy cover class is approximately 45,000 to 90,000 acres or 15-30 percent of the total acreage of mountain big sagebrush. When added together with the high canopy cover, the combined total is 28-50 percent of the mountain big sagebrush acres with canopy cover over 21 percent.

Figure V-16. Acres over Time in >31 Percent Canopy Cover Class for Mountain Big Sagebrush - Sawtooth National Forest



Sawtooth National Forest, Climax Aspen - The current condition of climax aspen has only 3.9 percent of acres in the medium/large size class, and all of these acres are in the <70 percent canopy cover class. Therefore, current condition reflects a paucity of acres in the medium/large size class, particularly in the >70 percent class. Figure V-17 shows the medium/large size class in the >70 percent canopy cover class (modeled as "mature" aspen) to determine how acres move into this class for each alternative. All alternatives show significant increases of acres in this class. Alternative 1B puts the most amounts of acres into this class (50 percent), followed in order by Alternatives 6, 5, 4, 2, 3, and 7. All alternatives exceed the 30 percent amount of this size class considered to be appropriate for the HRV. The HRV analysis shows that Alternatives 7, 3, 2, and 4 best meet the HRV for climax aspen, and they are the alternatives that put lesser amounts of aspen in this class. Alternative 7 meets the DC in all decades beyond the third (except for the fifteenth decade). Alternative 3 and 4 meet the DC for decades three through the fifteen; Alternative 2 meets it for decades three through fifteen, except for the fifth decade. Conversely, Alternatives 1B and 5 do not meet the DCs. These alternatives have DCs that require lesser amounts in this class to meet other alternative objectives. Alternative 6 meets the DC for decades three through fifteen, but has a DC that requires more acres in this class.

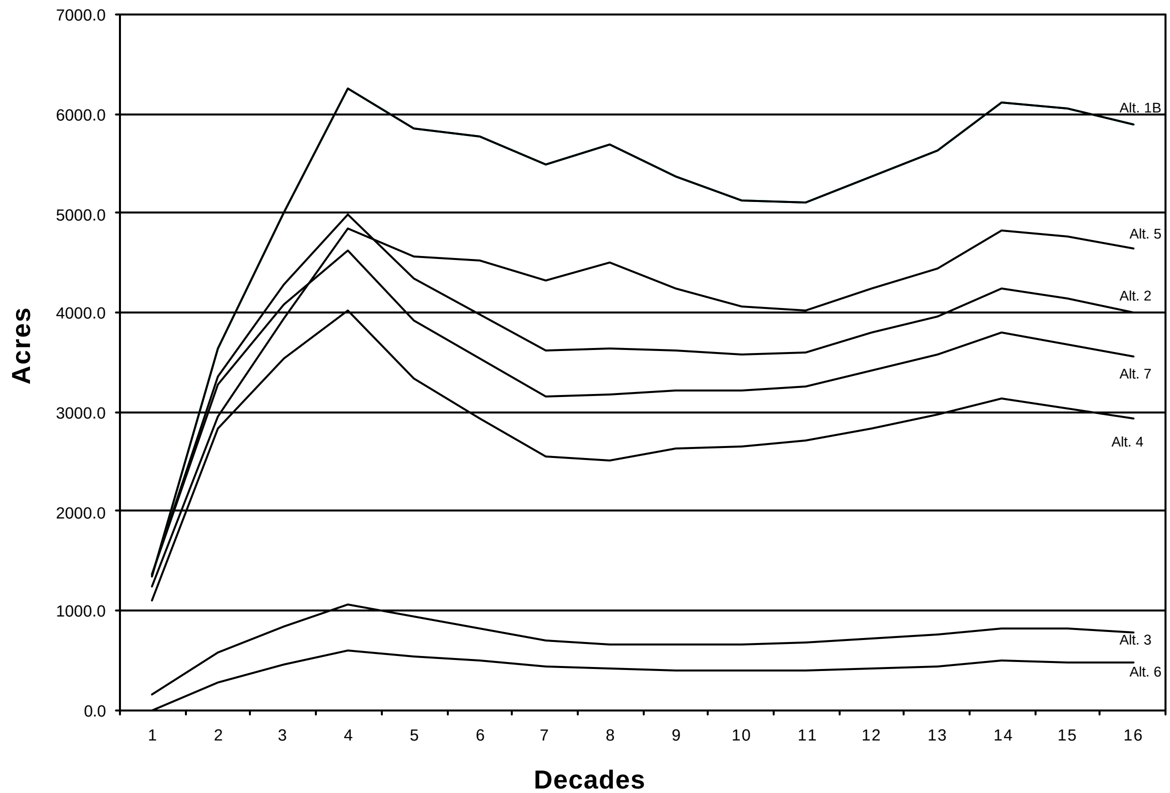
Figure V-17. Acres over Time in Mature Canopy/Size Cover Class for Climax Aspen-Sawtooth National Forest



Sawtooth National Forest, Low Sagebrush - Figure V-18 displays the results of the high canopy cover class for low sagebrush. No alternatives met the DC for low sagebrush, but the mapping and modeling accuracy of low sagebrush may not accurately display how low sagebrush behaves ecologically. This analysis looks at how the alternatives put acres into the high canopy cover class, because as canopy cover increases in low sagebrush, understory species change and fire cycles are disrupted (Longland and Young 1995). Although this approach may not accurately reflect the actual numbers of acres, it should help depict in part the ecological changes in low sagebrush communities.

Alternative 1B, followed by Alternative 5 would move the most acres into higher canopy cover classes in low sagebrush, presumably due to fire suppression. Alternatives 2, 7, and 4 follow. These alternatives have more wildland fire use and increasing levels of wildfire. Alternatives 3 and 6 would move the least amounts of acres into this class. These numbers may be due to the range of tools available in Alternative 3, and the level of wildfire disturbance in Alternative 6. Although wildfire disturbances may keep canopy covers from increasing, they could have negative effects to the quality of understory species available. These effects would also be important in Wyoming big sagebrush communities; although management objectives would emphasize maintaining higher amounts of acreage in the higher canopy cover classes, as reflected by the DCs for this type.

Figure V-18. Acres over Time in High Canopy Cover Class for Low Sagebrush-Sawtooth National Forest



Disturbance - VDDT also provides estimates of average disturbance levels per decade. Two types of disturbance were incorporated into the model, ecological disturbance (wildfire) and management disturbance. Appendix B describes in detail the disturbances modeled. Succession is also incorporated into the model. All numbers are expressed as the percent of the average acres disturbed in a decade, considered over a 150-year period.

<u>Boise National Forest</u> - Overall, succession did not show a lot of variance between alternatives. Alternative 5 had the highest overall amounts of succession, with an average of 64.7 percent of acres in a decade, over a 150-year period. This was followed by Alternative 3, 1B, 2, 7, 6, and least succession was in Alternative 4 with an average of 61.0 percent over the 150-year period. Total disturbance (ecological and management) is also highest in Alternative 5 (39.4 percent), followed by Alternatives 3, 7, 1B and 2 (same), and 4, with the least amount in Alternative 6 (29.3 percent). Broken down further, Alternative 5 had the highest amount of management disturbance (36.2 percent), followed by Alternatives 3, 7, 1B and 4 and 2 (all very close), and

Alternative 6 had the least amount (23.3 percent). Ecological disturbance showed an almost inverse relationship; Alternative 6 had the highest (6 percent), followed by Alternatives 4, 2, 1B and 7 (same), and 3, with the least amount in Alternative 5 (3.2 percent). Those alternatives with the greatest amount of management disturbance minimize the amounts of ecological disturbance, which also increases the amount of succession that occurs. That is why Alternatives 5 and 3 also have higher amounts of succession. When only looking at the first three decades, the amounts of disturbance were similar to what was observed over the entire fifteen decades.

There were differences in the alternatives in the types of disturbance that occurs. For example, although Alternatives 7 and 2 were generally ranked closely, Alternative 7 had more chemical use (14.2 percent average per decade) and less prescribed burning (12.5 percent average per decade) than Alternative 2 (11.9 percent and 17.0 percent, respectively). There was also more wildland fire use in Alternative 7 (7.2 percent vs. 3.6 percent). When contrasting Alternative 3 with 1B, there are higher levels of chemical use in Alternative 3 (14.1 percent vs. 11.7 percent), yet slightly less prescribed fire than in Alternative 1B (17.3 percent vs. 18.4 percent).

In summary, those alternatives centered on commodity production (Alternatives 5 and 1B), have the highest levels of prescribed burning, yet the lowest levels of wildland fire use. Alternatives that emphasize restoration are intermediate for both treatments (Alternatives 3 and 2), Alternative 7 ranks next, and Alternatives 4 and 6 have the lowest levels of prescribed burning. Alternatives 4 and 6 have the highest levels of wildland fire use, followed by Alternative 7. Chemical treatment occurred in descending order in Alternatives 7, 3, 5, 2, 1B, 4, and 6. These levels reflect the amounts of acreages in various MPC categories for each of the alternatives.

Sawtooth National Forest - Again, succession did not show a lot of variance between alternatives. Alternative 5 had the highest overall amounts of succession, with an average of 59.35 percent over a 150-year period,followed by Alternatives 3, 1B, 7, 2, and 4. The least succession occurred in Alternative 6, with an average of 55.0 percent over the 150-year period. Total disturbance (ecological and management) was also highest in Alternative 5 (37.7 percent), followed by Alternatives 3, 7, 1B, 2, and 4, with the least amount in Alternative 6 (26.6 percent). Broken down further, Alternative 5 had the highest amount of management disturbance (34.2 percent), followed by Alternatives 3, 7, 1B, 2, and 4, with Alternative 6 having the least (20.8 percent). Ecological disturbance showed an almost inverse relationship; Alternative 6 had the highest (5.8 percent), followed by Alternatives 4, 2, 7, 3, and 1B, with the least amount in Alternative 5 (3.4 percent). Those alternatives with the greatest amount of management disturbance minimize the amount of ecological disturbance, which also increases the amount of succession that occurs, explaining why alternatives like 5 and 3 have higher amounts of succession. When only looking at the first three decades, the amounts of disturbance were similar to what was observed over the entire fifteen decades.

There were differences in alternatives in the types of disturbance that occurs. For example, although Alternatives 7 and 3 were generally ranked closely, Alternative 7 had less prescribed fire (11.0 percent average per decade vs. 12.2 percent). Alternative 7 when compared with Alternative 5 had higher chemical use (13.2 percent per decade vs. 12.5 percent), less grazing (0.55 percent per decade vs. 1.0 percent), less prescribed burning (11.0 percent per decade vs. 19.0 percent), and more wildland fire use (7.3 percent per decade vs. 1.5 percent). Alternative 4 had lower chemical use than Alternative 3 (10.4 percent per decade vs. 13.1 percent), but higher use than Alternative 6 (10.4 percent per decade vs. 6.4 percent). Alternative 4 also had lower prescribed fire than Alternative 3 (8.0 percent per decade vs. 12.2 percent), but higher prescribed fire than Alternative 6 (5.8 percent). Alternative 4 had higher wildland fire use than Alternative 3 (8.0 percent per decade vs. 6.4 percent), but lower wildland fire use than Alternative 6 (8.0 percent per decade vs. 8.2 percent).

In summary, those alternatives centered on commodity production (Alternatives 5 and 1B), have the highest levels of prescribed burning, yet the lowest levels of wildland fire use. Alternatives that emphasize restoration are intermediate for both treatments (Alternatives 3, 2, and 7), and Alternatives 4 and 6 have the lowest levels of prescribed burning, yet highest levels of wildland fire use. Chemical treatment occurred in descending order in Alternatives 7, 3, 5, 2, 1B, 4, and 6. Grazing, which was only modeled for climax aspen occurred in descending order in Alternatives 5, 1B, 2, 3, 7, 4, and 6. Mechanical treatment (pinyon-juniper only) and regeneration harvest (climax aspen only) ranked similar to grazing. These levels reflect the amounts of acreages in various MPC categories for each of the alternatives.

Grazing was not modeled in the sagebrush types due to its extensive nature, but is discussed in direct and indirect effects common to all alternatives as it pertains to increases in shrub cover, effects to understory vegetation, and changes in fire cycles. It was difficult to directly represent the effects of grazing within the model; however, it is represented by proxy with some of the modeling parameters. For example, those MPC groups (see Appendix B) that would be expected to have higher levels of management for livestock would have more activities to enhance forage production for livestock grazing.

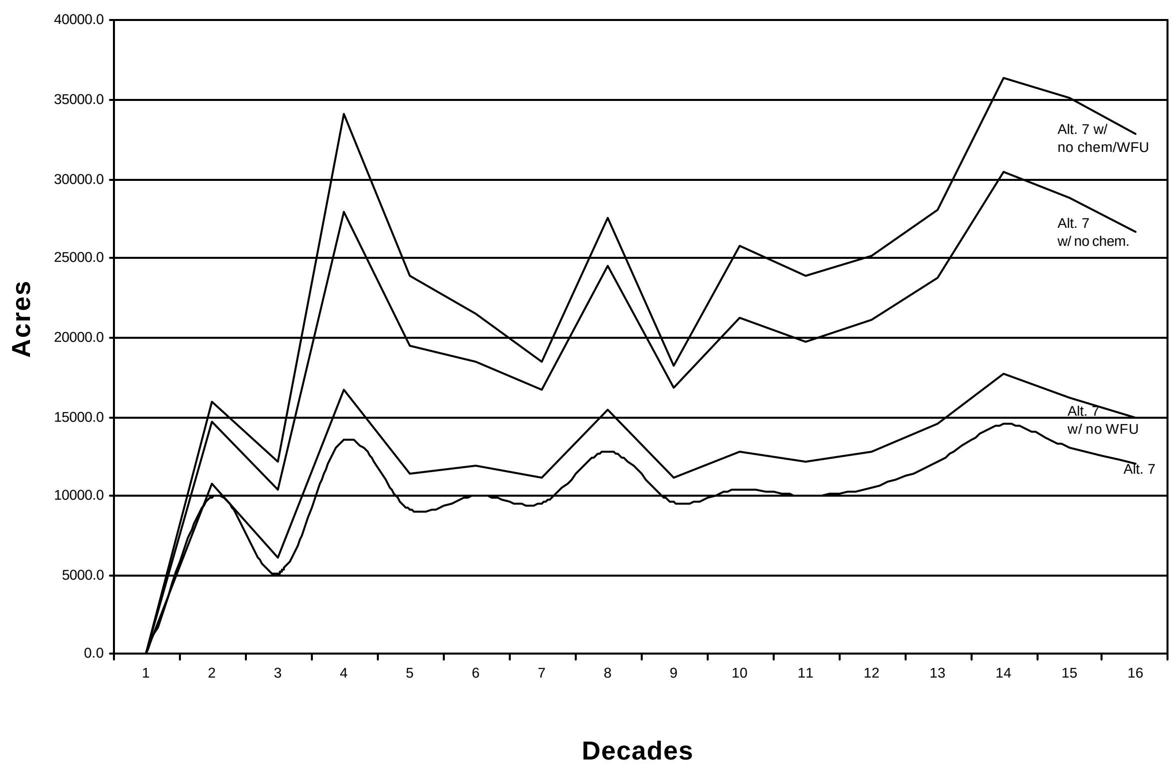
In designing the model parameters for non-forested vegetation, each alternative was modeled as to what were assumed to be predicted levels of management activities to implement the alternative. However, given current levels of budget and personnel, some of the management activities may have been overestimated in the modeling, or perhaps the same levels would be implemented, but they would have to be spread out over longer timeframes. This could act to further minimize differences between alternatives.

Sensitivity Analyses - Sensitivity analyses were conducted to look at the results of excluding wildland fire use and/or chemical treatment. These two treatments were chosen because they are not actively being implemented and they have the most public controversy. Chemical treatment refers to small-scale patchy treatments with chemicals such as tebuthiuron, used primarily to break up dense canopies and assist preparation for future prescribed burning or wildland fire use. The objective of these analyses was to see how these management actions would affect the results of the modeling for the new alternative in the FEIS, Alternative 7.

<u>Boise National Forest</u> - Eliminating wildland fire use from Alternative 7 does not have a large effect on the outcomes. All four vegetation types still meet the DC within 20 years. When chemical use is eliminated, only the mountain big sagebrush vegetation type reaches the DC. The primary reason why other vegetation types do not reach the DC is that more of the acreage moves into the medium and high canopy cover classes without chemical treatment, than with chemical treatment available as a tool. The mountain big sagebrush type remains within DC for

the first 50 years; however, by 100 years it moves out of the DC due to increasing amounts in the higher canopy cover classes. This effect doesn't occur in the first few decades, presumably because the current condition has 69 percent of the acres in the low canopy cover class. When both wildland fire use and chemical treatment are removed as available tools, again only mountain big sagebrush reaches the DC within 10 years. The amounts moving into the higher canopy cover classes are more pronounced. Figure V-19 displays the differences between Alternative 7 and the various sensitivity analyses for the very high canopy cover class (>31 percent).

Figure V-19. Acres over Time Differences within Alternative 7 by Varying Availability of Wildland Fire Use (WFU) and Chemical Treatment (Chem) in the Very High (>31 percent) Canopy Cover Class for Mountain Big Sagebrush – Boise National Forest



This analysis indicates that eliminating the use of these tools would influence the ability of any alternative to achieve desired conditions on the landscape. In order to compensate for the lack of these two particular tools, other management activity levels would probably need to be increased, such as prescribed fire or mechanical treatments. As already stated, this may not be possible given budgets and personnel available for implementing programs. When compared to the historical range of variability, only mountain big sagebrush is within the HRV for the first 5 decades with the lack of wildland fire use and chemical treatment; then this type falls outside the HRV due to the uneven distribution of acreage in the various canopy cover classes.

<u>*Sawtooth National Forest*</u> - Wyoming big sagebrush was not modeled with any chemical or wildland fire use, so the sensitivity analyses were not conducted on this type. Low sagebrush and climax aspen had no chemical use in the model. When wildland fire use is eliminated from

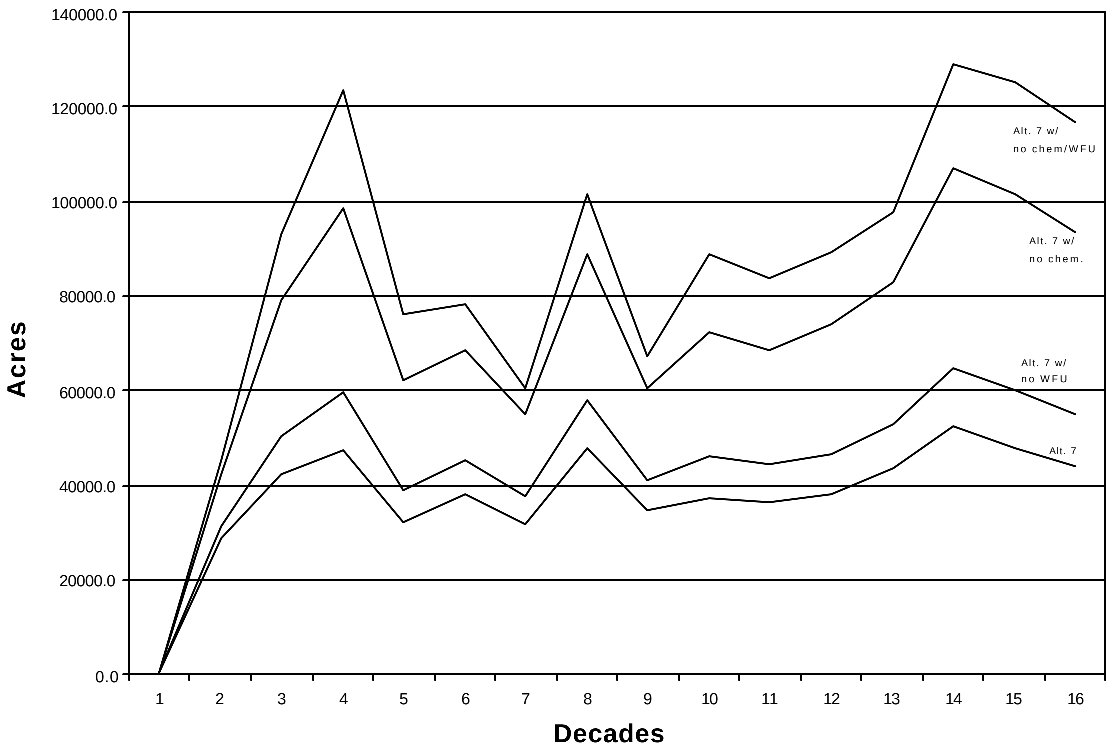
Alternative 7, the effect on the outcomes are small. The outcomes for basin big sagebrush, mountain big sagebrush, low sagebrush, mountain big sagebrush with bitterbrush, and pinyon-juniper remain unchanged when wildland fire use is eliminated from Alternative 7. Mountain big sagebrush with chokecherry, serviceberry, and rose no longer meets DC in the first decade, but remains the same in all other decades. Mountain big sagebrush with snowberry no longer meets the DC in the third, fifth, and fifteenth decades and climax aspen no longer meets the DC in the third and tenth decades. When chemical use is eliminated, the effects are more pronounced. Basin big sagebrush, mountain big sagebrush, and mountain big sagebrush with bitterbrush no longer meet the DC in the first, second, third, tenth or fifteenth decades. Mountain big sagebrush with snowberry does not meet the DC in any decade. Pinyon-juniper is unchanged, reflecting that it is not as sensitive to dropping chemical use as other vegetation types. However, acres converted from the pinyon-juniper back to sagebrush are only slightly less with the lack of wildland fire use, but substantially less with the lack of chemical use.

The primary reason why other vegetation types do not reach the DC is that more of the acreage moves into the high canopy cover classes without chemical treatment, than with chemical treatment available as a tool. When both wildland fire use and chemical treatment are removed as available tools, the same results relative to meeting the DC occur as when chemical alone is removed, except for low sagebrush and climax aspen. They display the same results for meeting the DC as if only wildland fire use is removed. However, for those vegetation types that utilize both these tools, the effects of more acres moving into the higher canopy cover classes is more pronounced than with only chemical or wildland fire use alone. The most pronounced change, however, is in the conversion of the pinyon-juniper back to sagebrush. Almost no acres are converted back to sagebrush with the lack of both wildland fire use and chemical treatment, indicating these could be key management options for this habitat type.

Figure V-20 displays the differences between Alternative 7 and the various sensitivity analyses for the very high canopy cover class (>31 percent).

The analyses indicate that eliminating the use of these tools would influence the ability for any alternative to achieve desired conditions on the landscape. In order to compensate for the lack of these two particular tools, other management activity levels would probably need to be increased, such as prescribed fire or mechanical treatments. As already stated, this may not always be possible given budgets and personnel available to implement various programs. For those vegetation types that were previously compared to HRV, only mountain big sagebrush is within the HRV for the fifth decade with the lack of wildland fire use and chemical treatment; it is outside for all other decades. Climax aspen and mountain big sagebrush with chokecherry, serviceberry, and rose are not within HRV for any decade.

Figure V-20. Acres over Time Differences within Alternative 7 by Varying Availability of Wildland Fire Use (WFU) and Chemical Treatment (Chem) in the Very High (>31 percent) canopy cover class for Mountain Big Sagebrush – Sawtooth National Forest



Grasslands - In order to examine differences between alternatives, several select management areas are reviewed in detail. The rationale for this is: (1) these management areas typically have a large proportion of grassland vegetation groups as part of the landscape; (2) grassland vegetation management activities are most likely to occur in these management areas because of their existing resource values; (3) the grasslands in these management areas provide areas of key terrestrial wildlife habitat; (4) these areas support a significant proportion of the livestock grazing in this vegetation group; and (5) they typically represent areas where management emphasis changes by alternative. Table V-124 identifies the names of the management areas that are used in the comparison of alternatives.

The rate of change and extent of future vegetation condition depends on the current condition of vegetation and what forms of management are priorities. By comparing alternative MPC assignments, some measure of what may occur with vegetation conditions can be displayed. MPCs are grouped according to the types of activities expected to occur, similar to groupings used in VDDT modeling for other non-forested vegetation types (See Appendix B). They are categorized into low, medium, or high groups, based on their perceived ability to maintain or restore vegetative conditions in grasslands. The high group would be expected to maintain current vegetative conditions and restore areas where needed over the longer time horizon. The medium group would have the best ability to restore vegetative conditions where needed, but could have short-term negative effects. The low group is not especially strong in either maintenance or restoration, although some restoration will occur. Conversely, there could be some continued degradation, particularly in localized areas. The acreage of MPCs groups in the selected management areas is displayed by alternative in Table V-125.

Table V-124. Management Areas Used in Alternative Effects Comparison for Grassland Vegetation

Vegetation Group	Boise NF MAs	Payette NF MAs	Sawtooth NF MAs
Grasslands (Perennial Grass Slopes and Montane)	Lower SF Boise River, Rattlesnake/Feather River, Arrowrock Reservoir, and Sagehen Reservoir	Hells Canyon, Snake River, and Weiser River	None

Table V-125. Grassland Vegetative Response by MPC Groupings (Acres)

MPC Groupings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt.5	Alt. 6	Alt. 7
High (1.1, 1.2, 2.2, 4.1a, 4.1b)	168,769	159,035	22,615	209,669	4,202	587,595	31,718
Medium (2.1, 2.4, 3.1, 3.2, 4.1c, 5.1, 8.0)	160,656	389,721	766,908	665,246	157,529	184,582	542,012
Low (4.2, 4.3, 5.2, 6.1, 6.2)	694,069	474,717	233,962	148,571	861,577	251,308	449,756

Overall, Alternative 6, and to a lesser degree, Alternative 4, are expected to maintain grassland vegetation conditions, provided that they are currently in a state to maintain. At the very least, these alternatives would see the least amount of continuing degradation. However, where areas are in need of restoration, the timeframes for restoration could be very long. Alternative 3, then Alternative 4, followed by Alternative 7 would have the best potential for restoring vegetation conditions where necessary in grassland ecosystems. Alternative 5, then 1B, would have the least likelihood of maintaining or restoring grassland ecosystems, and could have increased potential for additional degradation, based on the numbers of acres in the low MPC group. Considering both the high and medium groups together, Alternative 4 would have the most potential beneficial effects, followed by Alternative 3, closely followed by Alternative 6. Alternative 7, then Alternative 2 would be intermediate, followed by Alternative 1B, and lastly Alternative 5. This ranking is primarily based on the amount of high and medium potential to maintain or restore vegetation, but not contribute to further degradation. The MPC groups considered such things as amounts of wildland fire use and prescribed fire for resource uses, noxious weed spread and invasion, changes or maintenance of changes brought about by livestock grazing, and the potential for roads and recreation uses that could contribute to degradation of grassland environments. There is a fine balance between fire use as a restoration tool, which would hopefully decrease the frequency, severity, and extent of uncharacteristic wildfire, and some of the effects of fire use. Restoring fire regimes over the long term may entail some short-term negative effects. Other considerations include high potential for subsequent increases in extent and patch size of early seral successional stages through managing for structural stages and landscape patterns that favor forage production, increases in uncharacteristic wildfire activity, and the rate of expansion and invasion of exotic annual grasses and noxious weeds.

Riparian Vegetation

Forested Riparian Vegetation - Although each of the alternatives results in resource conditions that move toward a DC, which is based on the HRV, the effects across the landscape would differ in terms of specific plant community attributes and structural components. For riparian areas, the effects are not only what happens in those riparian areas, but also what happens in the uplands. For example, large woody debris in stream channels will to a large extent be influenced by what occurs to vegetation, particularly the large tree component. Eventually, these large trees become snags, and then coarse wood, and some of them will find their way to the riparian zone. Management direction for RCAs/RHCAs would help maintain the current condition or achieve riparian and aquatic objectives. However, for the action alternatives (2-7), short-term effects may occur if it can be demonstrated that there would be long-term benefits. Forest-wide standards and guidelines provide direction to maintain or restore riparian vegetation and soils, and to provide for the large woody material necessary for desired conditions and hydrologic function. Although the forested riparian area may have specific standards and guidelines, what happens in the forested upland PVGs surrounding them would have an effect in the riparian zones. For forested riparian areas, therefore, the same analysis that applies to the upland PVGs would apply to the forested riparian vegetation.

As discussed, another component of importance in forested riparian areas would be the recruitment of large-diameter trees and woody debris. Each PVG type has been modeled using SPECTRUM to meet different desired conditions and goals. The alternatives differ by their capacity to produce large size trees, given the mix of MPCs and the activities in those PVGs for each alternative. Therefore, each alternative is evaluated as to its capacity to produce large trees, hence large woody debris, and to maintain or restore forested riparian vegetation. A similar analysis regarding each alternative's capacity to produce large trees for recruitment of snags and coarse woody debris on the landscape is also conducted.

Although we cannot apply this analysis specifically to the forested RCAs/RHCAs, it is the closest approximation of what would happen in these areas. Generally, management in the RCAs/RHCAs would be more restrictive than in the uplands. As discussed for the forested PVGs, the best overall alternatives after five decades would be Alternatives 3 and 7 on the Payette National Forest. For the Boise National Forest, Alternatives 2, 3, and 7 are best, and on the Sawtooth National Forest, Alternatives 3 and 7 ranked the highest after 5 decades. As shown in the analysis, Alternative 4 elevates its rank in the later decades. This ranking applies to all three components; size class, canopy closure class, and species composition.

As was shown in the discussion for snags and coarse woody debris, Alternatives 3 and 4 provide the best opportunities over several decades of providing a recruitment pool of snags and coarse wood across the Ecogroup area. There are slight variations by Forest and by decade. When considering only the large trees, Alternative 3 dominates in the earlier decades; in later decades Alternative 4 dominates.

There would be other difference between alternatives with regards to forested riparian areas as well. Those areas with management for commodities or restoration may see increased sedimentation in riparian areas, which affects how well some plant species regenerate. Alternatives with higher risks for uncharacteristic wildfire (see *Fire Management* and *Vegetation Hazard* will have effects such as increased sediment loads, again affecting plant species regeneration, and moving the vegetation further away from the DCs. There will also be more site-specific effects, depending on the characteristics in the riparian area.

Deciduous Riparian Vegetation - Management direction for RCAs/RHCAs would help maintain the current condition or achieve riparian and aquatic objectives. However, under the action alternatives (2-7), short-term effects may occur if they demonstrate that they would have long-term benefits. Forest-wide standards and guidelines provide direction to maintain or restore riparian vegetation and soils. Some management areas also have more specific direction regarding plant genera and conditions in deciduous riparian areas. As with the current condition, effects would generally be site-specific and dependent upon individual characteristics of riparian zones and plant habitat types. However, in order to evaluate the alternatives and their potential effects, a similar approach to the analysis for grassland vegetation is used. Groupings of MPCs are based on the potential to maintain or restore vegetative conditions. MPC groups were formed similar to those used in VDDT modeling (see Appendix B), but in this case are primarily based on livestock grazing, noxious weeds, recreation, roads, mechanical treatments, and fire use, more or less in that order. This approach is based on a combination of effects that would occur directly in riparian areas, or those that would occur in the uplands and influence riparian areas. These MPCs are not grouped the same as they are for the grasslands, as there are different effects in riparian areas resulting from the mix of activities in MPC groups. This analysis is done for the entire Ecogroup area since the relationships between uplands and riparian zones, and between riparian zones with each other, reflects connectivity regardless of boundaries. This connectivity is displayed by such attributes as watershed geomorphic integrity, habitat patches, and plant dispersal. This analysis would also apply to the forested vegetation in the Ecogroup, since it covers the entire Ecogroup area. Table V-126 displays the numbers of acres in each MPC group by alternative.

Table V-126. Riparian Area Vegetative Response by MPC Groupings (millions of acres)

Non-forested Riparian MPC Groupings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt.5	Alt. 6	Alt. 7
High (1.1, 1.2, 2.2)	1.67	1.67	1.67	3.55	1.02	1.67	1.67
Medium (2.1, 2.4, 3.1, 3.2, 4.1a, 4.1b, 4.1c)	1.27	2.22	2.14	2.23	0.87	3.79	2.78
Low (4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 8.0)	3.68	2.72	2.80	0.83	4.73	1.14	2.16

The high MPC groupings would be most effective where riparian conditions should be maintained. In general, that would be the condition of many riparian areas in these MPCs. The medium MPC groups are most effective where conditions need maintenance and/or restoration. Natural recovery of native riparian vegetation may be extremely slow, even with reductions in livestock grazing, because of deterioration in the physical conditions of streams during the last 150 years, dominance of exotic annuals within the riparian area, and loss of native seed sources (Clary et al. 1996). All alternatives, except Alternatives 4 and 5, have equivalent amounts in the high MPC group. Therefore, most differences which could result in the best maintenance and restoration of riparian conditions would be in the combined values for the high and medium MPC groups. Alternative 4, followed by Alternative 6, would have the highest probability to maintain riparian vegetation where it is most likely to need maintenance, and to restore riparian vegetation that would be in need of restoration. These alternatives are followed by Alternative 7, then Alternatives 2 and 3, Alternative 1B, and lastly Alternative 5. Alternative 5, and then 1B, also have the greatest acreages of MPCs that could add to some further degradation due to activities in the uplands, although there are protective measures provided by RCA/RHCA management direction.

Cumulative Effects

Activities and disturbances that take place on National Forest System lands can affect larger scale functions beyond Forest borders, and conversely, the management of lands outside of the National Forests may influence Forest ecosystems. Vegetation management on other adjacent ownerships, including private, state, and other federal lands, may or may not consider the broad needs of ecosystem integrity, nor the more specific vegetation components. Therefore, National Forest System lands must provide for these attributes to contribute to functioning ecosystems, regardless of ownerships. Adjacent lands under varied ownerships and interspersed ownerships may have different management direction than the National Forests regarding the retention and production of vegetation components. Therefore, any Forest Service management activities affecting these components, particularly those vegetation components that are scarce outside of National Forest System lands, would affect the overall ecology and habitat properties they provide for the entire region. How the Forests manage vegetation can have far-reaching impacts on other ownerships and throughout the region, such as the spread of disturbances, the dispersal of wildlife, or soil-hydrological functions in watersheds. National Forest System lands can also be influenced in similar ways by the vegetation management on other ownerships. Understanding the interactions among the processes generating patterns in forest landscapes and the many functional ecological responses to these patterns and how they change through time is key to effective forest management (Franklin and Forman 1987, Spies and Turner 1999, Oliver et al. 1999).

The size class, density, species composition, snags, and coarse woody debris, and the distribution of these components, are difficult to cumulatively assess because they encompasses a diverse array of PVG types that vary in their distribution across the landscape. These elements differ in the degree to which Forest Service management and other management may affect their status. The amount of current scientific information and distribution data available also varies greatly, thus often limiting the assessment of the cumulative effects of all management activities and environmental consequences on vegetation components.

Several assumptions can be made, however, regarding cumulative effects. For example, it can be assumed that almost all of the higher-elevation PVGs in the cumulative effects area exist on National Forest System lands. Therefore, any Forest Service management activities affecting these communities will in general affect the overall ecology of high-elevation vegetation in the region. In the lower-elevation PVGs that are currently the furthest outside of the DCs (and the HRV), the restoration of these ecosystems, which would likely occur on federal lands, would benefit the overall function and habitat for these types. Some components may take many years before noticeable changes occur on the landscape. Other, more localized changes can be dramatic and immediate. For example, the removal of large trees affects not only size class distributions of forest stands, but the recruitment of snags over time and would reduce the density of large snags on a landscape basis for a period of time exceeding 50 years. Given the current conditions, removals of large trees on or outside of National Forest System lands would affect the distributions of both the large tree component and the future snags and coarse woody debris at a landscape scale. Therefore, the retention and future development of these critical components on National Forest System lands is essential to providing habitat elements needed by many species. Particularly in the lower-elevation ponderosa pine and warm, dry PVGs, improvements to these components would cumulatively affect the conditions of these types and improve conditions, given that restorative management can be limited on lands under other ownership.

RCAs/RHCAs across all alternatives would receive special management consideration to maintain or move toward desired conditions for riparian vegetation. Connectivity of upland vegetation types is provided through riparian areas, of which riparian vegetation is a component. Riparian vegetation also exerts influence on physical parameters such as bank stability and sedimentation; therefore, improvements in riparian conditions have far-reaching effects beyond the Forest boundaries in providing connectivity of habitats and geomorphic integrity, as examples. Several assumptions can be made regarding these cumulative effects. For example, it can be assumed that a large portion of the forested riparian areas exist on National Forest System lands within the Ecogroup area. National Forest System lands contain all or most of the headwaters. Therefore, Forest Service management activities affecting these areas would in general affect the overall ecology and watershed integrity of the Ecogroup area and adjacent land ownerships. A continued shortage of large trees affects the recruitment of large woody debris in stream channels over time and would reduce their presence in riparian areas on a landscape basis for a period of time exceeding 50 years. Therefore, removals of large trees, snags, or coarse woody debris on or adjacent to National Forest System lands would affect riparian functions at a landscape scale, particularly if these components are not being managed for on adjacent ownerships. These relationships make the management on National Forest System lands essential to providing the habitat and biophysical elements needed by many species.

Disturbances such as fire, insects, disease, and windthrow will travel across a landscape, depending upon conditions. In some cases, they may move from National Forest System lands to other ownerships, or they can move from other ownerships to National Forest System lands. Vegetative conditions have a big influence on the type of spread, extent, and direction of disturbances. Noxious weeds are another example where cumulative effects will travel between ownerships. Even within National Forest System lands, noxious weeds can spread if different Forests are not managing weeds at the same intensity levels.

Canopy closure of shrublands and the resultant patch and pattern of the vegetative mosaic created by the spatial distribution of canopy closures will have cumulative effects across ownerships with resultant indirect effects such as spread of fires and wildlife habitat. The amount, size of blocks, and lack of mosaic structural pattern of burned shrub and burned herbaceous vegetation groups result in landscape structure that is more homogeneous. Surrounding ownerships would influence the degree of homogeneity, either increasing or decreasing it. Spatial heterogeneity per se is an important component of ecological systems. Reducing spatial variability typically results in declining biological diversity (Petraitis et al. 1989), increased vulnerability to insects, pathogens (Lehmkuhl et al. 1994), or other disturbances, and decreased resiliency to subsequent disturbances (White and Harrod 1997). One key to improving sagebrush ecosystem vigor and productivity is to maintain or increase the diversity of its components. Diversity in this sense means a variety and mixture of plant and animal species, vegetative age classes, differing height structure, and horizontal patchiness within relatively small units of the landscape (McEwen and DeWeese 1987)

Variability is a key attribute of ecological systems, as well as a practical and realistic foundation for landscape-scale management. Sustaining ecosystems, species populations, and the amenities and commodities that society desires from ecological systems will require a long-term, landscape-scale approach to management that balances the needs, capabilities, and impacts among different areas with that landscape. Creating static reproductions of past ecosystems is neither possible nor desirable; however, understanding past ecological systems and the principal interactions and processes that influenced them helps managers set goals that respond to the ecological context and social values of an area (Landres et al. 1999). The use of natural variability concepts is not necessarily an attempt to simply mimic or recreate the processes that occurred on a site long ago, or to return managed landscapes to a single and unchanging past condition. Rather, it is an attempt to improve understanding about the ecological context of an area and the landscape-scale effects of disturbance. This understanding may then be used to make existing and future conditions more relevant and variable, and thereby ecologically sustainable (Covington et al. 1994, Wallin et. al. 1996, Lertzman et al. 1997). As seral stages change, some plant species will be lost and others gained. These are tradeoffs, which can be evaluated. To maintain biological diversity, all defined seral stages must be maintained (Benkobi and Uresk 1996). Analysis of an ecological system at different sites and over long timeframes provides the context that theory suggests is important in understanding the driving variables, constraints, and behavior of a system at local and shorter time scales (Allen and Hoekstra 1992).

Vegetation Hazard

INTRODUCTION

Historical range of variability (HRV) concepts were developed in part to better understand how disturbances, vegetation, and other ecosystem components interact, and in turn how this affects plants, animals, fish, soil and water, and numerous other resources. Underlying this concept is the assumption that ecosystems operating within their historical range are resilient and resistant to disturbances such as insects, disease, and fire, because they have evolved within the influence of these disturbances. In turn, the various components and processes that interact with vegetation are sustained and function as they did historically. Insects, disease, and other disturbance agents generally operated at endemic or characteristic levels within historical landscapes (Harvey 1994). Shifts in species composition and density have created vegetative conditions where insects, disease, and wildfire may operate at epidemic or uncharacteristic levels.

Often various disturbance agents operate synergistically over space and time (Steele et al. 1996). The classic example is the mountain pine beetle, fire disturbance complex exhibited in lodgepole pine ecosystems (Crane and Fisher 1986). These ecosystems often lack enough fuels to carry fire, particularly in the early stages of succession. Over time, mortality from mountain pine beetle increases as the stands mature, contributing to the fuel loading. At some point, conditions are ripe for fire, the stands burn, and the cycle begins again.

There are many examples of complementary disturbance processes, particularly at the landscape scale (Rogers 1996). However, representing these often stochastic interactions requires complex modeling efforts. This analysis addresses only the two most widespread landscape disturbances, insects and uncharacteristic wildfire. Though we recognize that these disturbances interact, they were evaluated separately to simplify alternative comparison.

Issues and Indicators

Issue Statement –Forest Plan management strategies may affect the amount of vegetation at risk to uncharacteristic wildfire and epidemic insect disturbances.

Background to Issue – Concerns were expressed both internally and externally about the risk of undesirable disturbances, like the large uncharacteristic wildfires that occurred in the mid-1980s and into the 1990s. In 2000, as a result of the large wildfires that occurred that year, the Secretaries of Agriculture and the Interior were directed to develop a strategy to address severe wildland fires, reduce fire impacts on rural communities, and ensure effective firefighting capability in the future. This strategy—which includes National strategic and implementation goals and plans, budget requests and appropriations, and agency action plans—is known collectively as the National Fire Plan. One of the National Fire Plan goals is to reduce hazardous fuels to a level that decreases the risk of unplanned and unwanted wildland fire to communities and to the environment. The effort to reduce the risk of effects to the environment is focused on areas where the current conditions may lead to uncharacteristic wildfires. In many cases, these events affect a host of resources—including fisheries, wildlife habitat, timber, visual quality, and soils—and have cost millions of dollars to suppress and mitigate. The long-term impacts of these disturbances prompted concerns about the likelihood of such events occurring in the future, and the potential to reduce the risks.

Indicators – The indicators used to measure vegetation at risk to uncharacteristic disturbance are: (1) Insect Hazard Index for forested vegetation, and (2) Uncharacteristic Wildfire Hazard Index for forested and non-forested vegetation. These indicators provide a relative measure of the potential for insect epidemics and uncharacteristic wildfires. The indices are directly related to changes in vegetative conditions, including size class and/or density, which will vary by the type and amount of vegetation treatment associated with each alternative.

CURRENT CONDITIONS

Current hazard conditions reflect current vegetation conditions. Current vegetation conditions have been influenced by rates of growth and development, and disturbances that have affected these rates. Vegetation is dynamic, continuing to change in response to the interaction of growth rates, successional development, and disturbance events. The growth stage matrix, developed for the vegetation modeling, was used to characterize hazard for both uncharacteristic wildfire and insect epidemics. The rate of change, reflected by growth and development of vegetation, varies in the model for each forested potential vegetation group (PVG) and non-forested vegetation cover type in accordance with the Growth Stages Matrix. Two growth stage matrices were developed for forested vegetation to account for different growth rates. One was associated with normal stand development, without vegetation treatments or natural disturbances that significantly alter existing stand structure or densities. The other growth stage matrix incorporates vegetation treatments that influence growth rates and stand development.

Conditions measured in the vegetation models are tree size class and/or canopy closure (density). Hazard was determined by assigning relative values to each cell in the growth stages matrix. The two forested vegetation growth matrices were evaluated separately and assigned hazard ratings based on assumptions about other components of the conditions, including species composition, vertical arrangement of vegetation, and for uncharacteristic wildfire, some indication of potential ground fuels. Insect hazard levels generally increase with increasing tree size and density. Uncharacteristic wildfire hazard levels also most often increase with density but have a more variable relationship to size class than the insect hazard ratings.

Insect Hazard

Insect Hazard Index

Each growth stage (combination of tree size and canopy closure) was rated for its susceptibility to epidemic insect activity. The effects of individual types of insects, or the combined effects of different classes of insects, especially bark beetles and defoliators, were considered. Output from the SPECTRUM model included the number of acres in each hazard class for each potential vegetation group. The hazard classes are none (0), low (1), moderate (2) and high (3).

Class 0 was labeled as none but actually represents a hazard classification of less than 1. Hazard was reported as the average number of acres in each hazard class for the middle of each decade, beginning with the current decade and continuing through the fifth decade.

Hazard is defined as a relative measure of predisposing conditions for damage caused by insects. This is similar to the definition of the term hazard used by Steele et al. (1996) in the publication, *Stand Hazard Rating System for Central Idaho Forests*. They further describe their hazard rating system as providing "…a relative measure of stand vulnerability to change agents within the next decade".

As previously stated, hazard ratings generally increase with increasing tree size and density. For example, areas in the grass/forb/shurb/seedling growth stage, or in the sapling tree size with low canopy closure growth stage are assigned a hazard rating of 1 (low) or 0 (less than 1), meaning that vegetation conditions, by themselves, do not predispose the stand or area to elevated levels of damage caused by insects. Areas in a large tree size and high canopy closure growth stage are usually assigned a hazard rating of 2 (moderate) or 3 (high), depending on the PVG.

An insect hazard index value of 2 indicates that a stand or area has an increased predisposition for insect damage. An insect hazard index value of 3 indicates that a stand or area is predisposed for epidemic insect activity. Damage from insects means that tree mortality can be expected to be higher than normal, and that the development from the current growth stage to a different growth stage will occur more rapidly. Growth stage will normally change to a less dense condition and/or to a smaller tree size class. The most extreme change would be equivalent to stand replacement, such as from a large tree size, high canopy closure growth stage to a grass/forb/shrub/seedling growth stage.

Species composition is an additional stand factor that was used in the stand hazard rating system developed by Steele et al. (1996). They adjusted hazard rating based on the percentage of host species within a given stand. Species composition was also considered in the development of the insect hazard rating used in the growth stages matrix for the SPECTRUM model. The two growth stage matrices, one each for normal and managed stand development, included a comprehensive characterization of each cell or growth stage. Species composition was part of this characterization and often revealed important differences between the normal and managed growth stages for the same growth stage within a potential vegetation group. Determining hazard through use of the SPECTRUM model considered all stands as having an initial hazard condition based on the normal growth stage matrix. After any treatment activity is applied by the model, hazard ratings are based on the managed growth stage matrix. This resulted in rating current insect hazard as being somewhat higher than actual conditions because the model fails to recognize present stand conditions in some of the small tree to large tree size classes that are currently better represented by the managed growth stage matrix.

Increases in fuel levels associated with increased mortality levels from insect activity may cause an increase in fire activity. In some cases these increased fuel levels can lead to uncharacteristic fires that may, in turn, have impacts to other resources, especially soils and wildlife habitat. Uncharacteristic fires are generally of a greater intensity and severity, leading to a greater likelihood of stand-replacement fires, and fires that burn over larger areas. These fire events have both short and long-term effects on soil resources. Short-term impacts are associated with increased soil erosion rates, while long-term impacts result from reduced soil productivity.

Uncharacteristic Wildfire Hazard

Uncharacteristic Wildfire Hazard Index

Uncharacteristic wildfire hazard is defined as the effect of wildfire on the vegetative conditions when it burns (rather than if it will burn) described by PVG, size class, and canopy closure for forested vegetation, or cover type and canopy cover for non-forested vegetation, relative to the historical effect. Hazard is based on the vegetative conditions that influence fire behavior and potential effects (Bachmann and Allgöwer 1999, Deeming 1990). The hazard ratings are low (0), moderate (1), high (2), and extreme (3). These ratings are based on individual growth stage matrix ratings that range from 0.0 to 3.0 with 0.0 assigned to low (0); 0.5 or 1.0 assigned to moderate (1), 1.5 or 2.0 assigned to high (2); and 2.5 or 3.0 assigned to extreme (3). Though these ratings were developed before release of the National Fire Plan (USDA Forest Service 2000), the definitions, criteria, and process for assigning hazard ratings and condition classes were identical except for the number of ratings (Schmidt et al. 2002). Table VH-1 shows the relationship between the SWI Ecogroup hazard ratings and the National Fire Plan Condition Classes.

Table VH-1. Comparison of the Southwest Idaho Ecogroup Uncharacteristic Wildfire Hazard Ratings and the National Fire Plan Condition Classes

SWI Ecogroup Hazard Rating	National Fire Plan Condition Class
Low (0)	Condition Class 1
Moderate (1)	Condition Class 2
High (2)	Condition Class 3
Extreme (3)	Condition Class 3

Fire regimes were used to determine the difference between current and historical fire effects. The fire regimes are defined as nonlethal, mixed1, mixed2, and lethal (more detail regarding the fire regimes can be found in the *Introduction, Table 3-2,* and in the *Fire Management* section). To develop the ratings, historical fire regimes were identified for each PVG or cover type as a whole, based on available literature about the vegetative communities and fire regimes. The current fire regime was described for each combination of PVG size class and canopy closure, or cover type-canopy cover, based on the knowledge and experience of Fire Management personnel. Hazard was based on the departure between the historical and current fire regime for each combination of size class and canopy closure by forested PVG or canopy cover by non-forested cover type. Within the growth stage matrix this difference was assigned a numeric value (0.0 to 3.0). For example, low hazard (0.0) assumes there is little difference between the historical and current fire regimes, while extreme hazard (2.5 or 3.0) assumes a substantial difference.

In practical terms, the uncharacteristic wildfire hazard rating (or Condition Class) represents a departure in the conditions that occur on the landscape relative to the historical fire regime rather than a true description of the effects within that condition. For example, historically, dense canopy conditions in the Warm Dry Douglas-fir/Moist Ponderosa Pine potential vegetation group (PVG 2) likely burned with lethal effects. However, dense canopy conditions were considered rare under the historically frequent, nonlethal fire regime that has been documented for this PVG. Therefore, a preponderance of dense canopy conditions on the landscape for this PVG represents a departure in the way fire historically operated and therefore a change in the uncharacteristic wildfire hazard.

The hazard ratings do not account for areas that contain conditions that have become departed due to external forces, such as the invasion of non-native plants, as these conditions were not well described in the available data used for the analysis. In some areas, non-natives such as cheatgrass (*Bromus tectorum*) have dramatically altered historical fire regimes, particularly the frequency of fire (Miller and Tausch 2001). In certain vegetative types, the increase in hazard could indicate a potential increase in the risk of invasion by non-natives as many of these species often increase following the high severity conditions created by lethal fire. However, mixed2 and lethal historical fire regimes occur in some of the vegetative types where non-natives are found, particularly in the non-forested vegetation communities. In these regimes, any kind of fire that provides the conditions for the establishment and/or spread of non-native plants, whether it is within the HRV or not, increases the risk of non-native invasion.

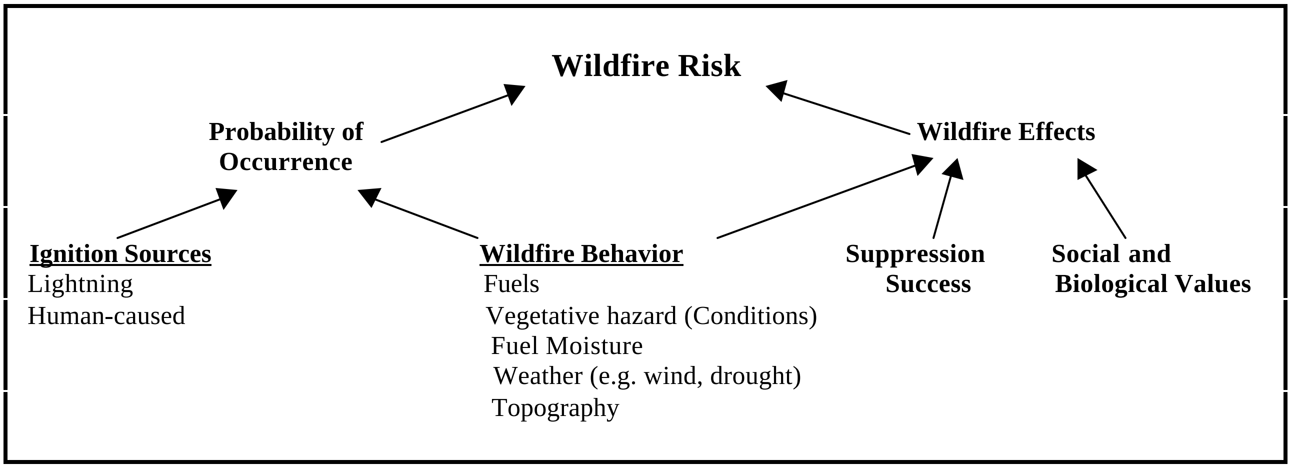
Uncharacteristic wildfire hazard indexes were developed by multiplying the total acres assigned to each growth stage matrix hazard rating by the rating (0.0 to 3.0) for different areas (PVG, Forest, wilderness, non-wilderness), and then summing the results for each area. Each result was then divided by the total number of either forested or non-forested acres for each area. The purpose of this approach was to account for different combinations of the ratings and amount of area with that rating. The indexes provided a relative comparison of vegetative hazard for a defined area or areas.

Wildfire Risk

Bachmann and Allgöwer (1999) describe wildfire risk as it relates to several factors, including the probability of occurrence and outcomes (wildfire effects) (Figure VH-1). The probability of occurrence is based on ignition sources (lightning or human-caused) and wildfire behavior, which is a function of vegetative hazard, weather, and topography. The effects of wildfire depend on wildfire behavior, the success of suppression actions, and social and biological values.

A wildfire, as currently defined by federal policy, is an "unwanted wildland fire". Fires ignited by humans, other than prescribed fires, are considered by the 1995 fire management policy to be wildfires. Fires ignited by lightning may be evaluated for wildland fire use if they occur within a designated wildland fire use area and can meet resource objectives and other requirements. If the ignition does not meet certain requirements, it is declared a wildfire, and some type of suppression action is implemented. In some cases, a lightning ignition occurring within a wildland fire use area and within prescription could be declared a wildfire due to a lack of available personnel to manage the ignition, the potential air quality impacts, adjacency to boundaries, or a host of other concerns not related to effects on natural resources. Wildfire, in and of itself, does not indicate a harmful impact. The wildfires of greatest concern are those with the potential to burn uncharacteristically, because these can have the most long-term effects to resources, or those that are threatening areas such as wildland-urban interface. The uncharacteristic wildfire hazard index is an attempt to evaluate how much area is in a condition that could lead to uncharacteristic wildfire rather than an evaluation of the overall wildfire risk.

Figure VH-1. Factors That Contribute To Wildfire Risk
(Adopted from Bachmann and Allgöwer 1999)



Current Conditions

Insect Hazard

Insect activity changes in response to changes in species composition and stand structure. The type and extent of changes vary somewhat by potential vegetation group. In most PVGs stand density has increased and in some cases species composition has changed from dominance by shade-intolerant species to shade-tolerant species. Additionally, in some areas, stand age has advanced to over-mature conditions. These conditions, individually and in combination, have resulted in increased susceptibility to large-scale insect infestation. Consequently, the size and intensity of areas attacked by insects has increased in many areas. In the drier PVGs, especially in stands where fire exclusion has resulted in the development of higher densities, bark beetles often replace fire as the cause of mortality. In PVGs where lodgepole pine is a significant cover type, fire exclusion has resulted in more continuous forest cover, leading to mountain pine beetle infestations that now affect larger areas, and for longer periods (ICBEMP 2000a).

According to aerial detection survey records dating back to 1968, bark beetles have killed over 4 million trees in the Ecogroup area. Depending on the particular year and location, this mortality ranged from endemic levels of widely scattered individual trees, to scattered groups of trees in one or more drainages, to large-scale epidemics where thousands of trees were killed over extensive landscapes.

The importance of such mortality is often a function of scale and management objectives. At endemic levels, bark beetles cause scattered mortality that provides important habitat for other plant and animal species, and woody debris that contributes to nutrient recycling. Bark beetles act as agents of change and play a critical role in the development, death, and rebirth of forests. Even at epidemic levels that result in very high rates of tree mortality, the effect of bark beetles can be considered beneficial or negative depending on the management objectives of the given area. In some forest ecosystems, such as lodgepole pine, mountain pine beetle outbreaks and subsequent fires are critical to ecosystem structure and function. However, bark beetle outbreaks can severely affect resource objectives, particularly in wildland/urban landscapes, watersheds, and high-value recreation areas. High levels of tree mortality result in loss of old growth, degraded watershed conditions, changes in species diversity and productivity, and loss in fish and wildlife habitat. Dead trees also add significant fuel loading to the forest. Extreme fuel loads can pose a threat to property and life.

Mountain pine beetle, which infests and kills various species of pine, was responsible for over 40 percent of all trees killed by bark beetles in the Ecogroup area since 1968. Most of this activity occurred on the Sawtooth National Forest in 1974-75. Another major outbreak of mountain pine beetle is currently underway in the Sawtooth Valley surrounding Stanley, Idaho, and will likely persist until most of the larger diameter (over 8 inches in diameter) lodgepole pine is dead. An estimated 1,000,000 lodgepole pine trees have been killed during this outbreak since 1998.

Douglas-fir beetle was responsible for killing approximately 25 percent of all the bark beetle-killed trees in the Ecogroup area and was most active from the mid-1980s to the mid-1990s. This beetle's activity, and that of western pine beetle, roughly coincide with a period of drought and wildfire; abiotic events that set the stage for higher levels of beetle-caused mortality.

The 10-year long spruce beetle outbreak from 1985 to 1994 on the Payette National Forest is also notable. This single infestation, where an estimated 393,000 trees were killed, was responsible for over 98 percent of the spruce beetle caused mortality in the Ecogroup.

Western spruce budworm and Douglas-fir tussock moth, which defoliate conifers, have also attained epidemic levels in the past. Western spruce budworm reached outbreak levels, defoliating Douglas-fir, subalpine fir, grand fir and western larch, on the Payette and Boise National Forests annually from 1968 through 1987, and on the Sawtooth National Forest from 1981 to 1987. In 1986, conifers on over 2.1 million acres were defoliated by western spruce budworm throughout the Ecogroup area. Repeated annual defoliation over this prolonged outbreak resulted in incremental growth loss, and varying degrees of top-kill and understory mortality. Spruce budworm-caused tree mortality, even after several consecutive years of defoliation, is usually light and limited to smaller, suppressed trees.

Currently, western spruce budworm populations are increasing in southern Idaho, with notable defoliation on 3,500 acres of the Boise Forest in 2002. Depending on several natural factors, including weather conditions, this population may collapse or it may expand over the next several years to encompass most of the susceptible Douglas-fir and true fir host type across the Ecogroup area. Several years of repeated defoliation can result in reduced aesthetic and visual values; reduced seed production; significant top-kill and mortality to understory host trees; and, radial growth loss, top-kill, and some mortality to overstory host trees, particularly where host trees are also infected with dwarf mistletoe. Bark beetles may also attack and kill host trees that are predisposed by repeated defoliation.

Douglas-fir tussock moth is another important defoliator of grand fir, Douglas-fir, and subalpine fir across the Ecogroup area. Outbreaks of Douglas-fir tussock moth are cyclical, occurring at intervals of 7-10 years. Populations develop explosively, causing severe defoliation and tree mortality, and then abruptly subside after 1-4 years. The last major outbreak of Douglas-fir tussock moth in southern Idaho occurred in 1990-92, when approximately 400,000 acres were defoliated on the Boise, Payette and Sawtooth National Forests. This outbreak coincided with a significant period of drought that probably contributed to high levels of tree mortality.

Douglas-fir tussock moth populations rose slightly during 1998-2000 on small portions of the Boise, Payette and Sawtooth National Forests. This increase resulted in little defoliation, and populations collapsed to endemic levels by 2001. Future outbreaks of Douglas-fir tussock moth can be expected to occur at 7-10 year intervals across the susceptible host types of the Ecogroup area. These outbreaks may be short-lived, causing only unsightly defoliation in isolated locations or they may be widespread and longer in duration, resulting in severe defoliation, top-kill, growth loss and mortality to host trees (Bennett and Their 2003).

The average insect hazard index for current vegetation conditions of the Ecogroup is 1.38. This index value was developed by calculating the weighted average hazard rating for the acres in each hazard class. The average insect hazard was also calculated for forest vegetation that represents the mean values associated with historical range of variability (HRV). The desired vegetation conditions for Alternative 3 best represent the mean of conditions present under HRV, therefore, Alternative 3 was used to estimate insect hazard under HRV conditions. Doing this provides an estimate of the insect hazard indices for forested vegetation represented by conditions equivalent to the mean HRV values and are, for the Boise National Forest 1.12, Payette National Forest 1.29, and Sawtooth National Forest 1.18.

The weighted average insect hazard index for current conditions is greater than the weighted hazard index for forested vegetation within the historical range of variability, but the hazard index for current conditions does not account for desired species composition in stands that have been previously managed, and thus the calculated hazard index for current conditions is somewhat exaggerated. Current conditions do, however, reflect the relatively large percentage of forested area in grass/forb/shrub/seedling and sapling growth stages brought about in part by insect-caused mortality and wildfire events that have occurred since 1979. Tree mortality, whether caused by insects or fire, often reduces both canopy closure and tree size class, creating conditions that have a lower insect hazard rating. Many of the recent insect epidemics and fire events have been similar to stand-replacing activities; thereby contributing to the large area currently occupied by the grass/forb/shrub/seedling, and sapling tree size growth stages.

Currently, about 49 percent of the forested vegetation in the Ecogroup area is rated as being at moderate or high insect hazard. An estimated 32 percent of the Ecogroup area has a moderate hazard rating for insects, while 17 percent has a high hazard rating. The remaining 51 percent of the forested vegetation within the Ecogroup area has an insect hazard rating of low or none.

Table VH-2 displays the percent of forest vegetation, for each Forest and Wilderness area, associated with each insect hazard index value. The Ecogroup average is also displayed.

Table VH-2. Percentage of Current Forested Vegetation In Each Insect Hazard Rating by Forest and Wilderness Area

Area	No Hazard (0)	Low Hazard (1)	Moderate Hazard (2)	High Hazard (3)
Boise NF	26	22	36	16
Payette NF (w/out Wilderness)	30	23	32	15
FC–RONRW	26	23	35	16
Sawtooth NF (w/out Wilderness)	28	25	26	21
Sawtooth Wilderness	27	44	20	9
Ecogroup Total	**28**	**23**	**32**	**17**

Uncharacteristic Wildfire Hazard

Since 1991, 21 percent of the acres in the Ecogroup have been burned by wildfire (Table VH-3). The amount burned from 1991 through 2000 was more than the previous two decades combined. These large wildfires are thought to be the combined result of drought that occurred through the late 1980s into the 1990s, and increases in hazardous vegetative conditions.

Table VH-3. Acres Burned in Three Decades by Forest and for the Ecogroup

Decade	Boise	Payette	Sawtooth	Ecogroup
1971-1980	11,474	3,407	6,534	21,415
1981-1990	218,335	201,999	39,201	459,535
1991-2000	454,250	673,643	81,889	1,209,782

Forested Vegetation - Currently, a total of 48 percent of the forested vegetation in the Ecogroup has a moderate, high, or extreme uncharacteristic wildfire hazard rating, increasing the risk that fires would burn uncharacteristically (Table VH-4). Such events affect soils, wildlife habitat and other resources by creating conditions that may be much different then they were historically.

Table VH-4. Percentage of Forested Vegetation Assigned to the Four Uncharacteristic Wildfire Hazard Ratings (Condition Classes) by Forest and Wilderness Area

Area	Low Hazard Rating (Condition Class 1)	Moderate Hazard Rating (Condition Class 2)	High Hazard Rating (Condition Class 3)	Extreme Hazard Rating (Condition Class 3)
Boise NF	44	38	15	3
Payette NF	56	29	8	7
FC–RONRW	54	31	12	3
Sawtooth NF	57	41	2	0
Sawtooth Wilderness	74	23	3	0
Ecogroup Total	**52**	**35**	**10**	**3**

The greatest hazard indexes (high and extreme) are in the warmer, drier PVGs including PVG 2 in all areas, and PVG 5 on the Boise Forest (Table VH-5). PVG 1—except on the Sawtooth Forest and Wilderness, and PVG 6 on the Boise Forest and in the Frank Church–River of No Return Wilderness (FC–RONRW)—have high hazard indexes. This means that current fire regimes are the least like historical in these groups. For example, PVG 2, which rated as extreme hazard where it occurs, contains vegetative conditions where fires today would more likely burn lethally compared to the historical nonlethal fire regimes. This change is related to shifts in distribution of vegetative conditions (size class, canopy closure, and species composition) across the landscape relative to the historical conditions. These shifts result in greater area in smaller trees that are less resistant to fire, and increases in stand density, ladder fuels, and more flammable species. Forested PVGs with moderate indexes are PVG 3 (except the Sawtooth Wilderness), PVG 4 in all areas, and PVG 6 on the Payette. In these PVGs, vegetative conditions are such that fires today may burn with greater intensity and severity than fires historically, but the conditions have not changed as much as in PVG 2.

Table VH-5. Uncharacteristic Wildfire Hazard Indexes for Forested Potential Vegetation Groups in the Ecogroup by Forest and Wilderness Area

Forest	Low Hazard Index	Moderate Hazard Index	High Hazard Index	Extreme Hazard Index
Boise	PVG 7 PVG 10 PVG 11	PVG 3 PVG 4	PVG 1 PVG 6	PVG 2 PVG 5
Payette	PVG 7 PVG 8/9 PVG 10 PVG 11	PVG 3 PVG 4 PVG 6	PVG 1 PVG 5	PVG 2
Frank Church–River of No Return Wilderness	PVG 7 PVG 8/9 PVG 10 PVG 11	PVG 3 PVG 4	PVG 1 PVG 5 PVG 6	PVG 2
Sawtooth	PVG 7 PVG 10 PVG 11	PVG 1 PVG 3 PVG 4		PVG 2
Sawtooth Wilderness	PVG 3 PVG 7 PVG 10 PVG 11	PVG 1 PVG 4		PVG 2

The lowest current hazard indexes are in PVGs 7, 8/9, 10, and 11. Fires in these PVGs are mostly mixed2 and lethal, which is similar to historical regimes. However, at a landscape level, fires today often produce larger lethal patches than occurred historically. This appears to be due to increases in homogeneity and a reduction of landscape mosaics caused in part by fire exclusion, past timber harvest, and blister rust in whitebark pine (Quigley and Arbelbide 1997).

A comparison of current size class and canopy closure to the historical conditions for the grass/forb/shrub/seedling and large tree size class found that, for most PVGs in all areas, there are currently more acres in the grass/forb/shrub/seedling and fewer acres in the large tree size class than historically (see *Vegetation Diversity,* Tables V-16, V-17, V-18, V19, and V-20). This indicates that the distribution of size classes relative to the historical is skewed toward smaller sized trees. The PVGs with the greatest departures relative to the large tree size class are those that currently have high or extreme uncharacteristic wildfire hazard indexes (PVGs 1, 2, 5, and 6). In all areas, PVG 1 shows the greatest change relative to historical conditions. Historically, the amount of area in this PVG in large trees was estimated to be 91.0 percent. Currently, 16.4 percent of the acres are in the large tree size class, which is a difference between the two of 74.6 percent (see *Vegetation Diversity* Table V-16). PVGs 2 and 5 followed PVG 1 in having the greatest departures between the historical and current large tree size classes.

Currently, the Boise Forest has the highest uncharacteristic wildfire hazard index for forested vegetation (Table VH-6). The FC–RONRW and Payette Forest have the second highest indexes. The Sawtooth Forest indexes are lower than the Boise and Payette. The Sawtooth Wilderness hazard index is the lowest of all areas primarily due to the preponderance of mixed2 and lethal fire regimes that occur there. Areas outside the Sawtooth Wilderness include some vegetative communities that transition from nonlethal on the west side of the Forest to mixed2 and lethal toward the east, mainly in response to the two different climatic regimes occurring over this area. The Sawtooth Forest, including the Wilderness, is primarily in mixed2 to lethal fire regimes. Much smaller amounts of nonlethal and mixed1 occur there compared to the Boise and Payette. Therefore the uncharacteristic wildfire hazard indexes for the Sawtooth overall are lower than the Boise and Payette Forests.

Table VH-6. Current Uncharacteristic Wildfire Hazard Indexes for Forested and Non-forested Vegetation by Area

Area	Current Condition	
	Forested Vegetation	Non-forested Vegetation
Boise NF	0.65	0.11
Payette NF	0.50	NA
FC–RONRW	0.51	NA
Sawtooth NF	0.36	0.12
Sawtooth Wilderness	0.24	NA

Non-forested Vegetation – A little over 23 percent of the non-forested vegetation on the southern portion of the Boise and the Sawtooth Forest is assigned a moderate or greater uncharacteristic wildfire hazard rating (Table VH-7). Uncharacteristic wildfire hazard indexes for the southern Boise and Sawtooth Forest are about the same (Table VH-6). The majority of the hazard in the non-forested vegetative communities is a result of conditions in the cover types that contain mountain big sagebrush as a dominant or co-dominant species. Most of the hazard on both Forests occurs as a result of the large number of acres in the medium (21-30 percent) canopy cover class; very few acres are in the very high (greater than 31 percent) class. Fire regimes in communities that contain mountain big sagebrush were historically mixed2. An increase in hazard in this fire regime indicates that conditions on the landscape have become more homogeneous. Wildfires today may be uncharacteristic compared to the historical regimes in that they may produce more extensive areas of lethal conditions than occurred historically.

Table VH-7. Percentage of Non-forested Vegetation Assigned to the Four Uncharacteristic Wildfire Hazard Ratings (Condition Classes) on the Southern Boise and Sawtooth Forest

Area	Low Hazard Rating (Condition Class 1)	Moderate Hazard Rating (Condition Class 2)	High Hazard Rating (Condition Class 3)	Extreme Hazard Rating (Condition Class 3)
Boise NF	79	21	0	0
Sawtooth NF	76	24	Trace	0
Ecogroup Total	**77**	**23**	**Trace**	**0**

Background Wildfire (Wildfire Index) - All three Forests experience a certain level of wildfire each decade. Lightning ignites many of these wildfires, though some are the result of humans.

For the past three decades (since 1971), the number of ignitions on all three Forests has been relatively static (Table VH-8).

Table VH-8. Average Number of Lightning and Human-caused Wildfires per Year for Three Decadal Periods by Forest

Forest	Decade	Lightning (Avg. per year)	Human-caused (Avg. per year)	Total (Avg. per year)
Boise	1991-2000	118	36	154
	1981-1990	139	29	168
	1971-1980	138	36	174
Payette	1991-2000	116	12	128
	1981-1990	113	13	126
	1971-1980	101	27	128
Sawtooth	1991-2000	26	21	47
	1981-1990	24	21	45
	1971-1980	24	31	55

This analysis assumed that some level of "background wildfire" would occur on each Forest based on the fact that there will continue to be ignitions. This background level was developed from historical fire records and was intended to represent wildfire occurrence for "normal" weather conditions. Background levels were based on averages of the small and medium-sized fires that occurred between 1950-1994 for the Boise, 1970-1994 for the Payette, and 1980-1994 on the Sawtooth. Since the majority of starts, at least on the Boise and Payette Forests, are from lightning, there is little control over ignitions. Background wildfire represents those fires that are successfully suppressed during initial attack but burn some acres before they are put out. In general, during years of normal or unusually cool and/or wet weather, wildfires are suppressed while they are still small. The analysis of the data to generate the background wildfire for the modeling indicated that between 50,000-100,000 acres burned each decade throughout the Ecogroup area. These fires were assumed to be stand-replacing events. Therefore, acres affected by background wildfire were assigned to the earliest growth stage in the vegetative modeling.

The data used to generate acres burned by background wildfire did not include large wildfire events in the 1980s and 1990s, as these are thought to have been a result of unusually warm and dry weather combined with hazardous vegetative conditions. Information about the larger fires was used separately from the background wildfire to introduce wildfires that may occur as a result of abnormal (unusually warm and dry) weather conditions. During abnormally warm and dry years, fire behavior, particularly in areas with uncharacteristic vegetative conditions, is often more severe and can result in fires that are difficult to suppress during initial attack (Agee 1997). These fires often grow quickly and result in larger wildfires than those that are typically suppressed during initial attack. We defined these types of fires as "failed fire suppression" or "escaped initial attack".
Two different models were used to evaluate vegetation. The forested vegetation was modeled using SPECTRUM and VDDT while the non-forested vegetation was modeled using only VDDT (see *Appendix B* for more details about the models). Wildfires that occur as a result of

"failed fire suppression" are not represented in the SPECTRUM modeling because this model does not provide a mechanism to account for these highly variable, stochastic events. The model can account for background wildfire as a constant (non-stochastic) variable. In contrast to SPECTRUM, the VDDT model can account for both non-stochastic and stochastic events but not for the types of goals and constraints evaluated using SPECTRUM. In order to address potential changes in wildfire occurrence for the forested vegetation, the VDDT model was used "post-SPECTRUM" to determine acres burned by failed fire suppression. To accomplish this, VDDT models were developed that provided the same vegetative conditions for each alternative over time based on the disturbances modeled in SPECTRUM. Once it was determined that the VDDT models were producing the same results as SPECTRUM, failed fire suppression was introduced as a disturbance.

Wildfire events were simulated in VDDT using the same disturbance sequencing so that they occurred in the same time periods from one alternative to another. Therefore the difference between the alternatives in acres burned by large events is due to differences in vegetative conditions rather than a different number of events. It is also important to note that wildfire acres generated by VDDT are not a "best guess" of the amount that might occur in the future. Rather, this analysis was developed to show relative differences between the alternatives based on probabilities assigned to vegetative conditions using acres burned by past wildfires as a guide.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Over the past several decades, landscapes have been altered due to a variety of factors including fire exclusion (Agee 1997). In many areas, particularly in the nonlethal and mixed1 fire regimes, ladder fuels have created fuel profiles that now support higher intensity crown fires in areas where such fires were historically rare (Graham et al. 1999). In other areas where fire intensity has not changed, such as in the mixed2 or lethal fire regimes, the homogeneity of fuel conditions has increased fire size. These conditions, particularly when coupled with extreme weather, can lead to wildfires that grow beyond the ability of suppression resources to stop them and, in some cases, jeopardize firefighter and public safety in areas like wildland-urban interface.

There are a variety of factors that contribute to the risk of wildfire (Figure VH-1), and there are several strategies that can be employed to reduce this risk. Fire prevention activities that reduce the number of human-caused ignitions decrease the probability of fire occurrence. Treatment of hazardous fuels and vegetative conditions alters fire behavior and effects (Pollet and Omi 2002). Conditions that burn with low-intensity provide the greatest opportunity to suppress fires while they are still small (Omi and Martinson 2002, Wagle and Eakle 1979). This approach is particularly effective in nonlethal and mixed1 fire regimes, as this is consistent with the way these communities function (Fulé et al. 2001, Omi and Martinson 2002). In the mixed2 and lethal fire regimes it is more difficult to maintain low-intensity conditions over the long term, even though under-burning may have occurred historically. Over time, species mixes and vegetative development at the stand level tend toward high-intensity fires (Brown 2000, Omi and

Martinson 2002). In these areas, changing the pattern of fuels across the landscape can provide opportunities to reduce the extent of wildfires through fuel breaks or strategic locations where suppression resources can safely attempt fire suppression (Deeming 1990, Finney 2001, Graham et al. 1999).

Other strategies to reduce the risk of wildfire include developing suppression resources in areas where there are currently none, increasing the size of existing suppression resources, upgrading or updating equipment, fostering cooperation among the various entities that own or manage the landscape, and educating property owners about methods for protecting their property or structures. While many of these activities have been taking place across the country, the National Fire Plan was developed in part to better define responsibilities, increase cooperation, and provide funding for many of these programs.

General Effects

Changes in hazard reflect changes in growth stages. Movement of vegetation from one growth stage to another is the direct effect of vegetation growth rates, management activities, and disturbances such as insect outbreaks or wildfires. The type and extent of management activity are predicted by the SPECTRUM model in response to constraints and goals for desired conditions. Achieving these goals within a certain budget is the primary factor that can influence change in hazard. For non-forested vegetation, the VDDT model predicts the type and extent of management activities and disturbances based on probabilities assigned to the various growth stages. It does not provide the same mechanisms for meeting goals and constraints that are provided by the SPECTRUM model.

Insect Hazard - Changes in growth stage and the rate of stand development can affect other Forest resources. Impacts to wildlife, soils, fuels, and other ecosystem components may result, because these ecosystems have evolved within a given disturbance regime. When a disturbance regime is significantly altered, development of forest vegetation may undergo substantial changes, and other resources may be affected. Areas that experience decreases in stand density may adversely affect wildlife species that benefit from denser stands, while other species may benefit from more open conditions. Areas that experience mortality levels that result in stand-replacement conditions may result in a mix of growth stages that rarely if ever occurred in the historical development of that ecosystem. Re-establishment of a more typical mix of growth stages may require many decades. During the interim periods, while a more desirable mix of growth stages is being re-established, individual ecosystem components may be adversely or beneficially affected, but ecosystem processes in general will function at an elevated level of risk. During this period the risk of wildfire may also increase in areas with elevated amounts or woody fuel less than 3 inches in diameter, before significant settling, compaction, and decomposition reduces fire hazard.

Changes in growth stage and the rate of stand development caused by insect activity and elevated levels of mortality may also affect the sustainability of forest products and the value of products removed. Increased mortality levels may result in short-term effects leading to increases in the availability of timber associated with salvage harvest and restoration activities. When mortality becomes too extensive, the ability to sustain predicted harvest levels, within the allowable sale quantity, may be impaired. The value of harvested timber products may also be reduced. Dead trees removed during salvage harvest often have experienced some deterioration, or staining of the wood, resulting is reduced monetary value.

Uncharacteristic Wildfire Hazard - The effects of uncharacteristic wildfire would be the same for all alternatives; what varies is the risk of these kinds of fires based in part on hazard (Figure VH-1). As defined by the hazard indexes, the risk of uncharacteristic wildfire is greatest in the nonlethal and mixed1 fire regimes, as these have the greatest hazard ratings. In these fire regimes, current hazard is primarily a result of changes in species composition and vegetative density. Uncharacteristic wildfires can also occur in the mixed2 and lethal fire regimes, but the primary effect is change in patch sizes. This happens as the landscape becomes more homogeneous, resulting in larger patches of similar size or density classes. In the mixed2 and lethal fire regimes, individual vegetative communities may be within the historical frequencies, and therefore effects within the community are closer to characteristic. At the landscape level, however, lethal patch sizes, due to increased homogeneity of vegetative conditions from fire exclusion, may be larger following a wildfire than those that occurred historically (Arno 1976, Barrett et al. 1991).

Although stand-replacing fires did occur in nonlethal and mixed1 fire regimes in the past, these events were likely smaller in scale, and less extensive than they are today (Arno et al. 1995, Arno et al. 1997, Barrett et al. 1997). Currently, uncharacteristic wildfires kill those individuals, like large ponderosa pine, that had survived centuries of past fires. This adversely affects wildlife, soils, and other ecosystem elements as these ecosystems have evolved primarily under a different kind of fire regime. In forested ecosystems, wildlife species that use large snags or coarse wood will be affected in the long term as the available woody debris declines. Large trees (those greater than 20 inches) may take over 100 years to grow to that size. Also, uncharacteristic wildfires can create high-density shrub fields over large areas, particularly in PVGs 2 and 5, which were uncommon historically. Though ponderosa pine seedlings, if planted immediately following a fire, can outgrow many shrub species developing from seed, Douglas-fir can better tolerate these shrubby conditions (Steele and Geier-Hayes 1993). In some areas—for example PVGs 1, 2, and 5—the vegetative communities have been altered from ponderosa pine as the dominant community to a ponderosa pine-Douglas-fir mix or even a Douglas-fir dominated community. In these PVGs, communities dominated by ponderosa pine-Douglas-fir or Douglas-fir alone over large areas were not common on the historical landscape and likely have fire regimes or other disturbances processes that are not like historical conditions. In addition, noxious weeds or other exotics can invade susceptible areas. These species often delay or prevent re-establishment of native vegetation. This change in the vegetative component can have long-term impacts on ecosystem processes and functions.

Uncharacteristic wildfire events impact soils in the short and long term. The lethal, generally large-scale nature of these fires increases the risk of mass-movement and surface runoff (Wondzell 2001), and can reduce soil productivity. Generally the risk of soil erosion is a short-term impact that declines as the sites revegetate. Landslide risks can last longer, as these are often a function of the loss of overstory trees or other deep-rooted vegetation that provide a soil anchor. Once these species re-establish, the risk typically declines. Changes in soil productivity may be the most long-term effect as soils have evolved under the historical disturbance. Fires recycle nutrients retained in live and dead organic matter found on the site. Changes in fire regimes, either in frequency or intensity and severity, can reduce soil productivity by changing soil properties, and reducing the soil's ability to absorb and recycle nutrients.

Direct and Indirect Effects by Alternative

Insect Hazard

Insect hazard for the Ecogroup area increases over time for each alternative, from the current average index rating of 1.38 to a range of 1.65 (Alternative 7) to 1.76 (Alternative 4) at the end of five decades. The increase in hazard is primarily due to an increase in the average tree size class, or in other words, because of the greater percentage of area occupied by large size trees. For example, on the Boise National Forest approximately 10 percent the forested area is currently occupied by trees in the large tree size class. After five decades this area is projected to increase to an estimated 23 percent of the forested landscape, and to between 36 and 52 percent of the area after 10 decades, depending on the alternative. The increasing trend in insect hazard is true for each Forest, however the decade-to-decade changes, ordering of alternatives by hazard index, and the magnitude of change varies by Forest. Table VH-9 shows the insect hazard index for the current conditions and the predicted conditions in the fifth decade. This is shown for each Forest and for each alternative with an Ecogroup Summary also displayed.

The area rated as having a moderate or high insect hazard index also increases over time for each alternative. SPECTRUM model outcomes show current conditions have an estimated 49 percent of the Ecogroup's forest vegetation in a moderate or high insect hazard condition. The area in a moderate or high insect hazard increases over time in each alternative. The percentage of area in this condition ranges from an estimated 53 percent (Alternatives 2 and 7, Boise National Forest) to an estimated 77 percent (Alternative 1B, Sawtooth National Forest) in the fifth decade. The ranking of alternatives by percent of area in the moderate and high insect hazard rating varies for each Forest. The following table (Table VH-10) shows the average hazard index rating, and the percent of area in moderate and high hazard for each Forest, and for each alternative, for the current conditions, and for the fifth decade.

Table VH-9. Average Insect Hazard Indices by Alternative and Forest after 5 Decades

Area	Current Hazard Index	Average Hazard Index After 5 Decades						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt 7
Boise NF	1.41	1.71	1.66	1.70	1.72	1.68	1.72	1.65
Payette NF	1.36	1.78	1.76	1.77	1.79	1.73	1.77	1.78
Sawtooth NF	1.38	2.05	1.87	1.96	1.89	2.01	1.99	1.76
Ecogroup Total	**1.38**	**1.82**	**1.75**	**1.79**	**1.78**	**1.77**	**1.80**	**1.72**

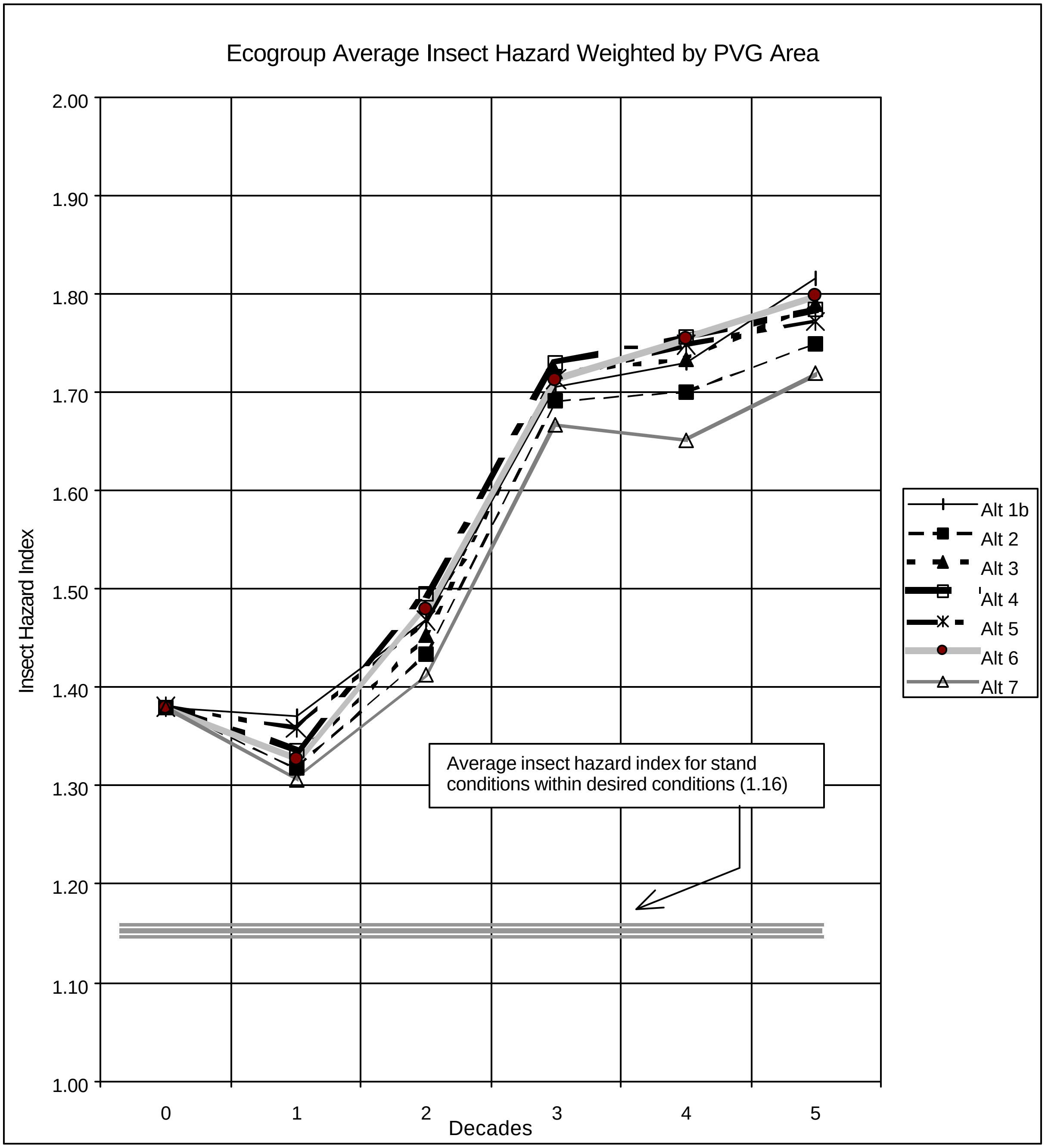
Table VH-10. Percent of Forest Vegetation in High and Moderate Insect Hazard by Alternative and Forest After 5 Decades

Area	Current Percentage	Percent Rated at High and Moderate Hazard After 5 Decades						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt 7
Boise NF	51	61	54	56	57	58	56	55
Payette NF	48	67	65	66	65	64	64	66
Sawtooth NF	46	79	72	76	73	77	77	67
Ecogroup Total	**49**	**67**	**63**	**64**	**64**	**64**	**64**	**62**

Figure VH-2 graphically displays the average insect hazard index rating for the entire Ecogroup area for each alternative, beginning with the current conditions, continuing through to the fifth decade.

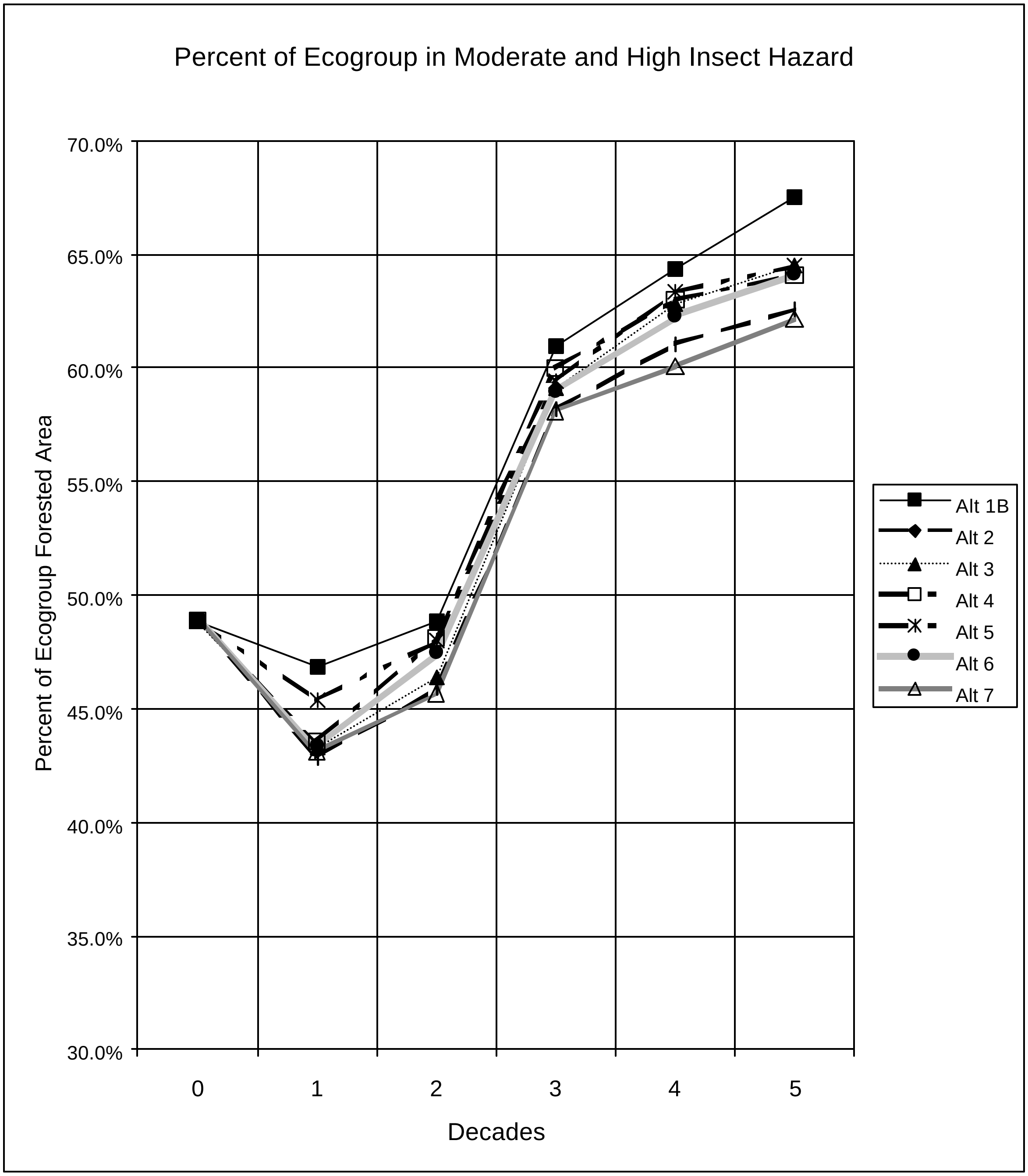
Figure VH-3 graphically displays the percent of the Ecogroup forested acres that have a moderate or high insect hazard rating. This is shown for the entire Ecogroup area for each alternative, beginning with the current conditions, continuing through the fifth decade.

Figure VH-2. Average Insect Hazard Rating by Alternative through the Fifth Decade



Note: Decade 0 represents current conditions. Decades 1 through 5 represent conditions expected to exist after treatments that occur in the previous decade and following 10 years of vegetative growth and development. Thus, decade 5 represents the conditions expected to exist in 50 years or about the year 2050.

Figure VH-3. Percent of Forested Acres at Moderate and High Insect Hazard by Alternative through the Fifth Decade



Note: Decade 0 represents current conditions. Decades 1 through 5 represent conditions expected to exist after treatments that occur in the previous decade and following 10 years of vegetative growth and development. Thus, decade 5 represents the conditions expected to exist in 50 years or about the year 2050.

Within each Forest the current insect hazard rating is the same for all alternatives. There is little difference between alternatives during the first few decades due to the combined effects of continued stand growth and development and the relatively small percentage of area that receives management actions during a decade. Differences between alternatives in their insect hazard index become more apparent during the fourth and fifth decades. The insect hazard index is described below for each Forest for conditions projected for the fifth decade.

Boise National Forest - Insect hazard index increases to values that range from 1.65 for Alternative 7 to a high of 1.72 for Alternatives 4 and 6. This compares to the current condition with an insect hazard index value of 1.41, and an average index value of 1.09 (range is 1.04 to 1.14) for forested vegetation that meets desired conditions. An estimated 51 percent of the forested vegetation is currently in a moderate or high insect hazard. This is projected to increase to between 54 percent for Alternative 2, and 61 percent for Alternative 1B. The percent of area in a moderate or high insect hazard would be 31 percent, ranging from 27 percent in Alternative 1B to 35 percent in Alternative 4 for forest vegetation that meets desired conditions. After 5 decades, the small difference in insect hazard index values (1.65 to 1.72) and the small difference in the percent of area with moderate and high hazard values (54 to 61 percent) does not indicate any important difference between the alternatives relative to the future risk of insect epidemic disturbance. Each alternative shows an increased predisposition to epidemic insect disturbance when compare to the current insect hazard index, indicating that insect population levels can be expected to expand to above endemic levels. Some noticeable mortality would be expected, but it would not normally be widespread. Further comparing alternatives, after 5 decades Alternative 7 has the lowest insect hazard index followed in order by Alternatives 2, 5, 3, 1B, 6, and 4. The differences between alternatives are only slight and are not expected to show any important difference in the level of insect-related damage.

Payette National Forest - Insect hazard index increases to values that range from 1.73 for Alternative 5 to a high of 1.79 for Alternative 4. This compares to the current condition with an insect hazard index value of 1.36, and an average index value of 1.22 (range is 1.13 to 1.33) for forested vegetation that meets desired conditions. An estimated 48 percent of the forested vegetation is currently in a moderate or high insect hazard. This is projected to increase to between 64 percent for Alternatives 5 and 6, and 67 percent for Alternative 1B. The percent of area in a moderate or high insect hazard would be 44 percent, ranging from 37 percent in Alternative 5, to 49 percent in Alternative 4 for forest vegetation that meets desired conditions. After 5 decades, the small difference in insect hazard index values (1.73 to 1.79) and the small difference in the percent of area with moderate and high hazard values (64 to 67 percent) does not indicate any important difference between the alternatives relative to the future risk of insect epidemic disturbance. Each alternative shows in increased predisposition to epidemic insect disturbance when compare to the current insect hazard index so that insect population levels can be expected to expand to above endemic levels. Some noticeable mortality would be expected, but it would not normally be widespread. Further comparing alternatives, after 5 decades Alternative 5 has the lowest insect hazard index followed in order by Alternatives 7, 2, 3, 6, 1B and 4. The differences between alternatives are only slight and are not expected to show any important difference in the level of insect related damage.

Sawtooth National Forest - Insect hazard index increases to values that range from 1.76 for Alternative 7 to a high of 2.05 for Alternative 1B. This compares to the current condition with an insect hazard index value of 1.38, and an average index value of 1.14 (range is 1.01 to 1.22) for forested vegetation that meets desired conditions. An estimated 46 percent of the forested vegetation is currently in a moderate or high insect hazard. This is projected to increase to between 67 percent for Alternative 7 and 79 percent for Alternative 1B. The percent of area in a moderate or high insect hazard would be 42 percent, ranging from 31 percent in Alternative 1B to 48 percent in Alternatives 3 and 4, for forested vegetation that meets desired conditions. The difference in insect hazard index values (1.76 to 2.05) and the difference in the percent of area with moderate and high hazard values (67 to 79 percent) indicates some small differences between the alternatives relative to the future risk of insect epidemic disturbance. Each alternative shows in increased predisposition to epidemic insect disturbance when compare to the current insect hazard index so that insect population levels can be expected to expand to above endemic levels. Alternative 3 with an insect hazard index value of 1.96, Alternative 6 (1.99), Alternative 5 (2.01) and Alternative 1B (2.05) are especially notable because the projected hazard index is close to 2. While some mortality would be expected in all alternatives, it would likely be more widespread and could contribute to epidemic insect activity in Alternatives 3, 6, 5 and 1B. The area in a moderate or high insect hazard is also greatest in Alternatives 1B, 3, 5 and 6, ranging from 76 to 79 percent of the area occupied by forested vegetation. This would further support the possiblity of greater insect damage associated with Alternatives 1B, 3, 5, and 6, after 5 decades. A final ranking of alternatives, after 5 decades shows Alternative 7 has the lowest insect hazard index, followed in order by Alternatives 2, 4, 3, 6, 5 and 1B.

Uncharacteristic Wildfire Hazard

Forested Vegetation, Effects of the Desired Conditions - Desired conditions determine the vegetative stages that occur on the landscape. They vary for the alternatives depending on the alternative theme. Because vegetative conditions are the basis for determining uncharacteristic wildfire hazard, desired conditions, when achieved, define the level of hazard that occurs on the landscape. Some desired conditions are more hazardous than others. Desired conditions that move the landscape toward the historical range of variability, particularly toward larger trees and lower densities, are less hazardous from an uncharacteristic wildfire standpoint than alternatives that move conditions farther away from historical. Desired conditions that move the landscape toward a distribution of size classes and densities that are not within the historical range produce more uncharacteristic wildfire hazard because they represent a departure in the conditions that maintained the historical fire regime.

Desired conditions for forested vegetation were developed using historical range of variability as the anchor (Morgan et al. 1994). The large tree desired conditions for all areas except MPC 5.2 are within HRV. For MPC 5.2 areas, the desired conditions in PVGs 1, 2, 3, 5, and 6, not including Riparian Conservation Areas, are below the low end of HRV for the large tree size class to provide for a greater mix of other size classes on the landscape. These are the PVGs that make up the nonlethal and mixed1 fire regimes. Desired canopy closures are denser for PVGs 2, 5, 7, 8, and 9. The combinations of greater size class distribution and/or denser canopy closures are desirable under this MPC in order to increase yields needed to support wood fiber goals under the various alternatives. Table VH-11 displays the percentage of total forested acres for each alternative in areas outside of designated wilderness that are managed for a greater mix of smaller size classes and/or denser canopy closures than historical. Because the management of designated wilderness does not vary by alternative it was not included in this comparison.

Table VH-11. Percentage of Forested Vegetation Outside of Designated Wilderness with Desired Conditions not in the Historical Range of Variability for Size Class and/or Canopy Closure for Alternatives by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	32	8	0	0	39	5	19
Payette	26	11	0	0	42	8	15
Sawtooth	2	0	0	0	14	0	0

There are no MPC 5.2 areas assigned in Alternatives 3 and 4 so the desired conditions Forest-wide are within the historical range of variability. This is also the case for Alternatives 2, 6, and 7 on the Sawtooth. Alternative 5, followed by 1B, on all three Forests has the most area managed outside of HRV. On the Boise and Payette, Alternative 7 ranks third. Alternatives 2 and 6 are between Alternatives 7, and 3 and 4.

SPECTRUM modeling DCs were used to estimate the hazard indexes for the desired conditions for areas outside of designated wilderness for each alternative (see *Appendix B* for information about the modeling DCs). Uncharacteristic wildfire hazard indexes for modeling desired conditions on the Sawtooth were similar (Table VH-12). This is due primarily to the small number of acres in PVGs that contribute to hazardous conditions. On the Boise and Payette, the modeling DC for Alternatives 3 and 4, which was the mean of HRV, has the lowest uncharacteristic wildfire hazard indexes for the desired conditions. The modeling DC for Alternative 2 was midway between the low end of HRV and the mean (see *Vegetation Diversity*, Figure V-1). The desired condition for this alternative produces a hazard index similar to Alternatives 3 and 4. Alternative 5 has the most hazardous modeling desired condition; the DC across the Forest for this alternative is the farthest from HRV. The hazard index for Alternative 1B desired conditions is lower than Alternative 5, but is the second highest. The modeling DC for this alternative was the low end of HRV. Alternatives 6 and 7 fall in between Alternatives 1B and 2.

Table VH-12. Uncharacteristic Wildfire Hazard Indexes for the Forested Vegetation Modeling Desired Conditions

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	0.23	0.11	0.10	0.11	0.27	0.17	0.20
Payette	0.20	0.12	0.12	0.12	0.21	0.17	0.17
Sawtooth	0.08	0.07	0.07	0.08	0.08	0.07	0.07

Even though the uncharacteristic wildfire hazard index for desired conditions for alternatives that contain more MPC 5.2 area is greater than those alternatives that contain less, wildfire risks related to this hazard is determined by on several factors. Depending on the objectives for specific areas across the Forest, fuel breaks, strategic placement of less hazardous conditions relative to more hazardous, the location of conditions in relation to the topography, and typical fire movement patterns all factor into determining risk (see the Resource Protection Methods discussion in this section and in *Fire Management*). There are also opportunities within the MPC 5.2 range to reduce the hazardous conditions. This can be accomplished by providing more area at the higher end of both the large tree size class and low canopy closure range. This condition is closest to the historical range of variability for those PVGs that contribute the most to hazard. Therefore, these conditions reduce the risk of uncharacteristic wildfire the most within the MPC 5.2 desired condition range.

Frank Church–River of No Return and Sawtooth Wildernesses - Modeling scenarios were developed for the two Wilderness areas administered by the Ecogroup based on the current Wilderness management plans. The outcomes for the FC–RONRW show little change in the uncharacteristic wildfire hazard index over time from the current condition (Table VH-13). Vegetative conditions in the Wilderness are primarily a function of wildland fire disturbances that fluctuate in size and intensity depending on fuel and weather conditions. Some years produce many fires and others few. Some ignitions are managed for wildland fire use but others are suppressed depending on the burning conditions, resources available to manage the ignition, air quality considerations, location, expected size, and other factors. Hazard reduction is not an overall goal in the Wilderness except as it relates to specific areas, for example around inholdings. Therefore, hazard tends to fluctuate around some level depending on the amount of area that has or has not been affected by wildland fire.

The hazard index for the Sawtooth Wilderness showed an increase after five decades. The Sawtooth Wilderness is relatively small with many natural fuel breaks, and the current Wilderness Plan expects few acres to be treated, especially at higher elevations, from lightning ignitions that originate in the Wilderness. More than half of the uncharacteristic wildfire hazard that accumulates by the fifth decade occurs within PVGs 1 and 2, which are located at lower elevations adjacent to the Boise Forest. These areas are more likely to be treated from wildland fire use that moves from the Boise onto the Sawtooth rather than from ignitions that originate in the Wilderness. Coordination regarding wildland fire use between the two Forests would allow for more fire use. This would potentially create a different hazard index than was projected by the model.

Table VH-13. Area-wide Wildfire Hazard Index for the Current Condition and the Fifth Decade for the Frank Church–River of No Return and Sawtooth Wildernesses

Area	Current Index	Index for Fifth Decade
FC–RONRW	0.51	0.48
Sawtooth	0.21	0.49

Outside of Designated Wilderness - All alternatives except 1B included reduction of uncharacteristic wildfire hazard as one of the modeling variables to emulate the National Fire

Plan objectives (see *Appendix B*). An additional consideration was budget (see *Appendix B* for discussions on budgetary considerations). Addition of budget constraints affected alternatives in different ways. For all alternatives, the total number of acres treated over the entire modeled time period decreased. On all three Forests, addition of budget constraints decreased acres treated the most for Alternative 5. Alternatives 4 and 6 were least affected. However, though overall acres treated declined over the modeling period, in many cases, adding budget had only a minor influence on the achievement of the hazard reduction goals, with some exceptions. Alternative 1B accomplished greater hazard reduction when budget was not a factor. On the Boise, the hazard index for Alternative 1B with the budget was 29 percent greater than without budget (Table VH-14). However, as hazard reduction was not a modeling goal for this alternative, the outcome is the result of achieving other goals and constraints. Budget had a minor influence for the other alternatives on the Boise in that the indexes with and without budget were similar. This was also the case on the Payette, although adding the budget in Alternative 5 increased the hazard index the most for all the Payette alternatives.

Table VH-14. Percentage Change in Uncharacteristic Wildfire Hazard Index for the Fifth Decade with Budget Compared to Without Budget for Alternatives by Forest

Forest	Alt. 1B[1]	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	+29	+5	+8	-5	+10	+3	+2
Payette	+11	+2	+3	0	+22	0	-2
Sawtooth	+31	0	+30	0	+133	+35	+19

[1]Hazard reduction goal not represented for this alternative

Budget had minor influence on most alternatives on the Boise and Payette because, even though total acres treated decreased when budget constraints were included, the hazard reduction goals focused treatments on PVGs that contribute the most to hazard. For most alternatives, acres treated in the hazardous PVGs—primarily 1, 2, 5, and 6—remained the same or declined only slightly compared to PVGs that contribute less to hazard. Generally, treatment levels in PVGs 4 and 7, which are less hazardous PVGs, declined the most. For Alternative 5 on the Boise and Payette, treatment levels with budget constraints were the lowest of all the Alternatives in order to meet the Allowable Sale Quantity (ASQ) floor. This affected hazard primarily by reducing the treatments levels in PVG 1, which is not part of the suited timberlands. In this case, treatments were focused on PVGs that contributed to the ASQ.

Budget had the greatest influence on hazard on the Sawtooth. The decrease in total acres treated was much greater on the Sawtooth than on the Boise and Payette over the modeling period. Here, only Alternatives 2 and 4 provided similar hazard indexes when budget was added. Alternative 5 was most affected; adding budget increased the hazard index 133 percent. Alternatives 1B, 3, 6, and 7 were also affected. However, Alternatives 2 and 4 had enough budget funding to focus treatments on the PVGs that were contributing to hazard.

Uncharacteristic wildfire hazard for forested vegetation declined after five decades from the current index for all alternatives except 1B on all three Forests, and Alternative 5 on the Sawtooth (Table VH-15). Alternative 5 on the Payette had the same rating after 5 decades as the current index. On the Sawtooth, Alternative 2 was the same as the current, and Alternatives 2, 3, and 6 declined only slightly.

Table VH-15. Forest-wide Uncharacteristic Wildfire Hazard Indexes for the Current Condition and the Fifth Decade for Alternatives by Forest

Forest	Current Index	Index for Fifth Decade						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	0.65	0.81	0.45	0.41	0.38	0.57	0.41	0.57
Payette	0.50	0.62	0.43	0.38	0.38	0.50	0.38	0.49
Sawtooth	0.36	0.46	0.36	0.35	0.30	0.42	0.35	0.31

Changes in hazard indexes for the fifth decade for the alternatives resulted from changes in the number of acres assigned to the various hazard ratings (Table VH-16). Acres moving from more hazardous conditions to less hazardous lower the index and vice versa. For example, fifth decade hazard indexes for Alternative 1B on all three Forests increased from the current condition. In all cases, the number of acres assigned to the low hazard rating decreased and the number of acres assigned to extreme increased (Table VH-16). This was also the case for the FC – RONR and Sawooth Wildernesses at the fifth decade (Table VH-17).

Table VH-16. Percentage of Forested Vegetation Assigned to the Four Uncharacteristic Wildfire Hazard Ratings (Condition Classes) for the Current Condition and Alternatives by Forest

Hazard Rating[1] (Condition Class[2])	Current Condition	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise NF								
Low (Condition Class 1)	44	42	52	52	53	41	51	45
Moderate (Condition Class 2)	38	36	40	41	42	47	43	44
High (Condition Class 3)	15	8	5	4	3	9	4	5
Extreme (Condition Class 3)	3	14	3	3	2	3	2	6
Payette NF								
Low (Condition Class 1)	56	50	52	53	52	49	51	50
Moderate (Condition Class 2)	29	31	37	38	39	35	40	38
High (Condition Class 3)	8	9	9	7	8	14	8	7
Extreme (Condition Class 3)	7	10	2	2	1	2	1	5
Sawtooth NF								
Low (Condition Class 1)	57	43	51	52	56	45	51	56
Moderate (Condition Class 2)	41	50	45	44	43	49	46	42
High (Condition Class 3)	2	7	3	4	1	6	3	2
Extreme (Condition Class 3)	0	<1	<1	0	<1	0	<1	<1

[1]Southwest Idaho Ecogroup
[2]National Fire Plan

In general, alternatives with lower fifth decade hazard indexes than currently increased the number of acres assigned to the low hazard rating and decreased the number of acres in the higher hazard classes (high and/or extreme). On the Boise, Alternatives 2 through 7 produced fewer acres in the high class and though hazard in the extreme class sometimes remained the same or even increased (e.g., Alt. 7) the movement of acres among the ratings was enough to produce a lower hazard index than the current. On the Payette Forest, Alternatives 2 through 7 also moved acres out of the higher hazard classes, but more acres moved out of the extreme class and fewer from the high.

Table VH-17. Percentage of Forested Vegetation Assigned to the Four Uncharacteristic Wildfire Hazard Ratings for the Current Condition and Fifth Decade for the Frank Church River of No Return and Sawtooth Wildernesses

Hazard Rating[1] (Condition Class[2])	Current Condition	Fifth Decade
FC-RONR Wilderness		
Low (Condition Class 1)	54	52
Moderate (Condition Class 2)	31	38
High (Condition Class 3)	12	4
Extreme (Condition Class 3)	3	6
Sawtooth Wilderness		
Low (Condition Class 1)	74	49
Moderate (Condition Class 2)	23	40
High (Condition Class 3)	3	8
Extreme (Condition Class 3)	0	3

[1]Southwest Idaho Ecogroup
[2]National Fire Plan

Changes in hazard rating classes for the Sawtooth and the relationship to hazard indexes at the fifth decade were much more difficult to discern. Because there are fewer acres contributing to hazardous conditions, only subtle changes are reflected. For example, the hazard index for Alternative 7 at the fifth decade was 0.31 compared to the current condition of 0.36 though there were very small changes in the amount of area in the various hazard ratings. In this case, changes are more often within a hazard rating class, for example from 3.0 to a 2.5 than between rating classes (extreme to high).

<u>*Boise National Forest*</u> **-** Alternatives 3, 4, and 6 produced the lowest uncharacteristic wildfire hazard indexes after five decades (Table VH-15). These three alternatives, as well as Alternative 2, have the lowest hazard index for the desired condition (Table VH-12), and movement toward the DC over the first five decades appears to lower the overall hazard index. However, no alternatives achieved the hazard index for the desired condition because only a few PVGs in each alternative were at desired condition for forested vegetation in the fifth decade (see *Vegetation Diversity* Table V-95). In general, those that were at desired condition are not the PVGs that contribute the most to hazard. However, those PVGs not at the DC for an alternative were showing progress toward the desired condition. For example, currently for PVG 2, the large tree size class makes up 14.5 percent of the forest-wide area. The desired condition is for 80.0 percent of the PVG 2 area to be in the large tree size class (see *Vegetation Diversity,* Table V-15). Thus the difference between the desired condition and the current condition for large trees is -65.5 percent. At the fifth decade, the difference relative to the desired condition is -59.8 percent. The alternative is moving toward desired conditions but, due to the limitations imposed by growth rates, does not achieve desired condition for the PVG forest-wide at the fifth decade. This in turn is reflected by the uncharacteristic wildfire hazard index. Although the index for the

alternative is lower than the current index, it is still higher than the hazard rating for the desired condition. The hazard index for Alternative 5 at the fifth decade was closest to the hazard rating for the desired condition, followed by Alternatives 6 and 7 (Table VH-18). The smaller gap between the fifth decade and desired condition hazard index for Alternatives 5 and 7 occurred not because these alternatives reduced hazard more than others, but rather because the hazard indexes for the desired condition for these two alternatives are among the highest. Alternatives 2 and 3, which have lower hazard indexes for the desired condition, were farthest away.

Table VH-18. Percentage Difference Between the Forest-wide Fifth Decade and Uncharacteristic Wildfire Hazard Index for the Desired Condition for Alternatives by Forest

Forest	Alt. 1B[1]	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	72	76	76	71	53	59	65
Payette	68	72	68	68	58	55	65
Sawtooth	83	81	80	73	81	80	77

Uncharacteristic wildfire hazard indexes for PVGs that have extreme or high current hazard (Table VH-5) declined by the fifth decade for all alternatives except 1B, where hazard reduction was not a goal (Table VH-19). For PVG 2, which has the highest current hazard index, Alternative 4, followed by 6 and 3, reduced the index the most. Like with PVG 2, the fifth decade hazard index for PVG 5 was lower than the current condition for all alternatives except 1B. Alternative 4, followed closely by 3 and 5, resulted in the lowest indexes.

Table VH-19. Uncharacteristic Wildfire Hazard Indexes at the Fifth Decade for PVGs that had Extreme and High Current Condition Indexes on the Boise Forest by Alternative

PVG	Current Index	Index for Fifth Decade						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1	0.80	0.98	0.09	0.07	0.18	0.73	0.08	0.28
2	1.44	1.90	0.58	0.50	0.43	0.85	0.48	1.15
5	1.16	1.28	0.85	0.76	0.74	0.76	0.87	0.86
6	0.76	0.48	0.75	0.63	0.62	0.66	0.68	0.66

As with PVGs 2 and 5, uncharacteristic wildfire hazard indexes for PVG 1 declined for all alternatives except 1B. The greatest change occurred in Alternatives 3, 6, and 2. Current hazard in this PVG is high because of lack of past disturbance to remove ladder and ground fuels.

Alternatives that treat these conditions lower the hazard. Alternative 5 treats the fewest acres in this PVG and Alternative 6 treats almost all the PVG 1 acres in the first five decades. Alternatives 2, 3, and 4 also treat most of the acres in this time period.

For PVG 6, all Alternatives, including 1B, reduce uncharacteristic wildfire hazard though not as much as other PVGs. Alternative 2 reduces hazard the least and Alternative 1B the most. All the other alternatives are similar.

Payette National Forest **-** Like the Boise, uncharacteristic wildfire hazard was higher in the fifth decade than currently for Alternative 1B (Table VH-15). The hazard index for Alternatives 5 and 7 remain similar to the current condition even though hazard declines for some PVGs. This occurs because overall the Forest is below the moderate density desired conditions for these two alternatives. Consequently the increase in hazard results from acres moving into the moderate and high-density canopy closures. Alternatives 3, 4, and 6 have the lowest fifth decade hazard index. The alternatives that had fifth decade hazard indexes closest to the desired condition were similar to the Boise with a slightly different arrangement (Table VH-18). Here, Alternatives 5 and 7 followed Alternative 6. Like the Boise, Alternative 2 was farthest away and Alternatives 1B, 3, and 4 fell in the middle.

Hazard in PVG 2, which currently has an extreme uncharacteristic wildfire hazard index (Table VH-5), declined by the fifth decade for all but Alternative 1B (Table VH-20). Alternative 3, followed by 4, produced the lowest hazard rating, while Alternatives 7 and 5 were at the higher end. For PVG 5, which currently has a high hazard rating, the fifth decade hazard in Alternatives 1B and 7 was above the current. This appears to be from a combination of acres meeting the moderate density desired condition plus acres that are not treated and remain in high density. Alternatives that had lower hazard index for PVG 5 emphasize low density desired conditions and move more acres out of high density. Alternatives 4 and 6 produced the lowest hazard rating. PVG 1 is also currently at high. In the case of this PVG, all alternatives produced lower hazard than currently. Alternatives 6, 3, and 4 produced the lowest fifth decade hazard, while Alternatives 5 and 1B were the highest.

Table VH-20. Uncharacteristic Wildfire Hazard Indexes at the Fifth Decade for PVGs that had Extreme and High Current Condition Indexes on the Payette Forest by Alternative

PVG	Current Index	Index for Fifth Decade						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1	0.84	0.79	0.10	0.01	0.04	0.67	0.00	0.29
2	1.19	1.90	0.49	0.37	0.47	0.82	0.51	0.94
5	1.01	1.29	0.88	0.82	0.67	0.97	0.70	1.10

Sawtooth National Forest **–** Overall, the uncharacteristic wildfire hazard on the Sawtooth is lower than the Boise and Payette due to differences in the PVGs. The Sawtooth contains much greater area in the mixed2 and lethal fire regimes, which have lower hazard ratings. Hazard on the Sawtooth does not change as much as on the Boise and Payette for most alternatives. As with the other two Forests, hazard goes up for Alternative 1B (Table VH-15). Likewise, hazard increases for Alternative 5 which was most influenced by addition of budget. Alternative 2 remains at the current level, and Alternatives 3 and 6 decline slightly. Alternative 4, followed by 7, reduced hazard the most. Alternative 4, followed by 7, was closest to the desired condition hazard at the fifth decade (Table VH-17). However, the difference between the alternatives was not as great as on the Boise or Payette. The difference between Alternative 4 fifth decade hazard and desired condition is 73 percent, while for Alternative 1B the difference is 83 percent.

Only PVG 2 currently falls into the extreme hazard category (Table VH-4); there are no PVGs in high. However, though PVG 2 is in extreme, it accounts for only one percent of the total forested vegetation outside of the Sawtooth Wilderness. Forest-wide increases in hazard are primarily a result of changes in hazard for PVGs 4, 7, and 10. Even though hazard declined for most alternatives for the PVGs that generally produce the most hazard, hazard indexes increased in PVGs that are currently low. While the increase was not enough to push any one PVG out of the low category, because the hazard is currently relatively low, the cumulative changes were enough to increase the overall Forest-wide hazard index.

Forested Vegetation Hazard and Acres Burned by Wildfire - The number of acres burned by lethal wildfire over the first five decades was closely linked to changes in uncharacteristic wildfire hazard indexes. On all three Forests, Alternative 1B, which had the highest hazard index at the fifth decade, burned the greatest number of acres over the first fifty years (Table VH-21). Alternative 4 burned the fewest acres on all three forests. This alternative had the lowest hazard index at the fifth decade on the Boise and Sawtooth. On the Payette, the hazard index for Alternatives 3, 4, and 6 was the same at the fifth decade, and was the lowest compared to the other alternatives. The arrangement of alternatives from most to least acres burned was similar to the arrangement of hazard from highest to lowest on each Forest.

Table VH-21. Forested Vegetation Uncharacteristic Wildfire Hazard Index at the Fifth Decade and Total Acres Burned by Wildfire over the First Five Decades for Alternatives by Forest

Boise	Fifth Decade						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hazard index	0.81	0.45	0.41	0.38	0.57	0.41	0.57
Total Acres Burned	292,625	258,175	245,380	240,865	262,355	242,675	260,735
Payette	**Fifth Decade**						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hazard index	0.62	0.43	0.38	0.38	0.50	0.38	0.49
Total Acres Burned	374,560	354,135	330,395	324,595	369,015	337,420	349,415
Sawtooth	**Fifth Decade**						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hazard index	0.46	0.36	0.35	0.30	0.42	0.35	0.31
Total Acres Burned	126,480	120,225	117,250	112,995	124,995	119,420	113,625

Non-forested Vegetation - Non-forested vegetation was not analyzed on the Payette Forest, as there were not enough acres to represent in the modeling. For the Boise and Sawtooth, uncharacteristic wildfire hazard for non-forested vegetation was greater after five decades than current hazard for all alternatives. This occurred even with the introduction of wildfires that failed fire suppression. For all alternatives, the number of acres in the high canopy cover class, which was the primary contributor to hazard under the current condition, was less in the fifth decade than currently. However, in all cases the number of acres in the very high class increased dramatically (see *Vegetation Diversity*). The number of acres moving into the very high canopy cover class may be exaggerated by the modeling because currently there are much fewer acres in this class (Table VH-22). Acres move into the very high class from high; the rate of movement represented in the modeling may be faster than the rate that occurs in reality. The increase in hazard for all alternatives relative to the current condition resulted from an increase in acres in the very high canopy cover class. On both Forests, the alternative with the fewest acres in the very high class in the fifth decade (Alt. 5) had the lowest hazard index, while the alternative with the most acres in the very high class (Alt. 6) had the highest (Table VH-23).

Table VH-22. Non-forested Vegetation Uncharacteristic Wildfire Hazard Index for the Current Condition and the Fifth Decade for Alternatives by Forest

Forest	Current Index	Index for Fifth Decade						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	0.11	0.19	0.20	0.18	0.23	0.17	0.24	0.19
Sawtooth	0.12	0.18	0.18	0.18	0.21	0.16	0.24	0.18

Table VH-23. Non-forested Vegetation Uncharacteristic Wildfire Hazard Index and Percent of Total Non-forested Acres in Very High Canopy Cover in the Fifth Decade for Alternatives by Forest

Boise	Current Condition	Fifth Decade						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Hazard index	0.11	0.19	0.20	0.18	0.23	0.17	0.24	0.19
Percent of total acres	<1	11	12	10	15	9	17	11
Sawtooth	**Current Condition**	**Fifth Decade**						
		Alt. 1B	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
Hazard index	0.12	0.18	0.18	0.18	0.21	0.16	0.24	0.18
Percent of total acres	<1	9	10	9	12	8	16	9

This increase in hazard relative to the current condition resulted from movement of area from less to more hazardous uncharacteristic wildfire hazard ratings (Table VH-24). Acres move into the very high class based on the modeled pathways due to lack of disturbance (see *Vegetation Diversity* for examples of how acres move into the high or very high canopy cover class from other mechanisms not represented in the model). On the Boise the alternatives between 5 and 6 were, from lower to higher hazard, Alternative 3, Alternatives 7 and 1B, Alternative 2, and Alternative 4. On the Sawtooth, Alternatives 1B, 2, 3, and 7 rated the same, followed by Alternative 4.

Table VH-24. Percentage of Non-forested Vegetation Assigned to the Four Uncharacteristic Wildfire Hazard Ratings (Condition Classes) for the Current Condition and Alternatives by Forest

Hazard Rating[1] (Condition Class[2])	Current Condition	Alt. 1B	Alt. 2	Alt.3	Alt. 4	Alt.5	Alt.6	Alt. 7
Boise National Forest								
Low (Condition Class 1)	79	72	72	74	70	74	68	73
Moderate (Condition Class 2)	21	16	16	16	15	17	15	16
High (Condition Class 3)	0	12	12	10	15	9	17	11
Extreme (Condition Class 3)	0	0	0	0	0	0	0	0
Sawtooth National Forest								
Low (Condition Class 1)	76	74	74	75	72	76	69	75
Moderate (Condition Class 2)	24	16	15	15	15	16	15	15
High (Condition Class 3)	Trace	9	10	9	13	8	16	10
Extreme (Condition Class 3)	0	Trace	Trace	Trace	Trace	Trace	Trace	Trace

[1]Southwest Idaho Ecogroup
[2]National Fire Plan

The total number of acres burned by wildfire, both failed fire suppression and background, was greatest in the alternative with the most acres in the very high canopy cover and lowest in the alternative with the fewest acres in the very high canopy cover class (Table VH-25). The arrangement of alternatives based on acres in very high canopy coverage and acres burned by wildfire were in the same order. On the Boise this was, from least acres to most acres, Alternative 5, followed in order by 3, 7, 1B, 2, 4, and 6. On the Sawtooth, the order was Alternative 5, 1B, 3, 7, 2, 4, and 6.

Table VH-25. Total Acres Burned by Wildfire over the First Five Decades and Percent of Total Non-forested Acres in Very High Canopy Cover in the Fifth Decade for Alternatives by Forest

Boise	**Alt. 1B**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
Wildfire acres	20,819	21,178	17,796	28,893	16,567	31,362	20,717
Percent of total acres	11	12	10	15	9	17	11
Sawtooth	**Alt. 1B**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
Wildfire acres	135,781	142,870	137,609	175,312	122,373	208,438	140,559
Percent of total acres	9	10	9	12	8	16	9

Even though the acres in the very high canopy cover class may be exaggerated by the modeling, this would likely not change the relationship of the alternatives to each other based on hazardous conditions and wildfire. Given that the treatment rates in the high class would not change, the array of alternatives based on high rather than very high would be the same. Though the hazard rating for the high class is not as great as the very high, high canopy closure contributes to hazard. Currently the acres in the high canopy closures are the primary contributor to the current condition hazard index.

Summary of Risk of Uncharacteristic Wildfire - High levels of uncharacteristic wildfire hazard increase the risk of large, uncharacteristic wildfires. Alternatives that produce lower hazard reduce this risk. Some alternatives reduce the hazard in PVGs that have been most affected by recent wildfires. These are primarily the nonlethal PVGs that support ponderosa pine as a major seral species. However, none of the alternatives achieve the Forest-wide hazard rating for the desired conditions at the fifth decade primarily because of the large difference between the current and desired condition for most alternatives. In general, though, alternatives show progress toward the desired conditions and subsequently the uncharacteristic wildfire hazard ratings associated with the DCs. Exceptions are on the Sawtooth and for Alternative 5 where budget had some influence on treating the conditions that contribute to hazard. Reductions in hazard increase opportunities to move toward or maintain the desired vegetative conditions over time. They also reduce the risk of undesirable impacts to listed species, aquatic ecosystems, soils, commodities, air quality, and other areas of concern. Those alternatives where hazard increases over time are at higher risk of not achieving desired conditions and of producing undesirable impacts to resources and other concerns.

Cumulative Effects

Insect Hazard

Insect hazard increases for all alternatives over time. Increased hazard means that forest vegetation is more predisposed to the damaging effects of harmful insects than are the current conditions, and also that forest vegetation will be more vulnerable to insect-caused damage than what was most likely experienced under historical conditions. Hazard is not expected to continue an upward trend indefinitely, however. Forested vegetation conditions that contribute to hazard, species composition, tree size, and density should eventually achieve a degree of stability and then continue to develop toward desired conditions. Thus, hazard should eventually decline and approach a hazard level associated with desired vegetation conditions.

Increased insect hazard will not affect hazard levels of forested vegetation on other ownerships in the vicinity National Forest System lands. However, insect populations are not contained to any single ownership. When insect populations reach epidemic levels, healthy, vigorous trees are unable to withstand the pressure and may be damaged or killed. Insect populations at epidemic levels may expand rapidly, infecting large-scale areas that may extend to other ownerships. Stands on other ownerships likely exhibit a wide-range of conditions relative to insect hazard but this has less importance when insect populations are at epidemic levels. Forest vegetation conditions that are at moderate to high insect hazard levels on National Forest System lands may contribute to the development of an insect epidemic outbreak. If this should occur, forest vegetation on other ownerships may be at greater risk for elevated mortality levels. Several factors will determine the extent of risk on other ownerships, including type and condition of forest vegetation, proximity to insect epidemic outbreak, current climate conditions, the presence or absence of natural barriers to the expansion of the insect outbreak, effectiveness of suppression efforts, and the influence of naturally occurring insect pathogens and predators.

Uncharacteristic Wildfire Hazard

Increased hazard increases the risk from fires that move from other ownerships to National Forest System lands. Sometimes, vegetative conditions on adjacent ownerships, in particular private lands, are relatively hazardous. This hazard results from a lack of understanding about fire risk, the desire either aesthetically or economically to produce denser vegetative conditions, or other factors. Therefore, while the hazard on other ownerships may be high, the effects of fires moving onto National Forest System lands from other ownerships can change with changes in hazard. Lower hazard allows opportunities to suppress oncoming fires, keeping them small, or to reduce the effects of these fires. Conversely, higher hazard on National Forest System lands increases the risk of large, difficult to suppress wildfires that can cross over onto other ownerships.

Botanical Resources
Threatened, Endangered, Proposed, Candidate, and Sensitive Plants

INTRODUCTION

Botanical resources include both the abundance and distribution of different vascular and non-vascular plant species. This section presents a more detailed analysis of the rarest elements of the flora—threatened, endangered, proposed, candidate, and sensitive (TEPCS) plant species as well as a discussion of rare and unique communities, and culturally important plant species.

Plant species that are federally listed as threatened or endangered, or that are proposed for listing, are protected under the Endangered Species Act (ESA) and Forest Service regulations, as are candidate species and species of concern (those species with sufficient biological information and existing threats to warrant listing by the Fish and Wildlife Service). Sensitive species are similarly protected under the Regional Forester's Sensitive Species Program. For example, the Forests are required to maintain viable populations within planning areas and to identify and mitigate potential effects to these species from federal land-disturbing actions. In order to comply with the ESA and the Sensitive Species Program, Forest botanists conduct inventories during project planning to locate and protect any TEPCS plants in the project area.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect TEPCS and watch plant species populations and habitats.

Background to the Issue – Many vascular plant species are endemic to the regions encompassed by the Southwest Idaho Ecogroup (Ecogroup). Of these, many are considered rare by conservation organizations or federal and state agencies (Region 4 Sensitive Species List, Proposed 2000, Idaho Native Plant Society 2000, Idaho Conservation Data Center 2000). Four of these rare endemics are found only on National Forest lands within the Ecogroup area. In addition to these rare species, many of the rare endemics have a large portion of their global distribution found on national forest lands. In contrast, several plant species have wide global distributions but are rare within the Ecogroup area. This section analyzes the potential effects from Forest Plan management strategies by alternative on the rarest vascular and non-vascular plant species within the Ecogroup area.

Indicators – The indicators used to measure potential adverse effects on TEPCS plants are the following activities that would occur to some extent under every management alternative: (1) fire (wildfire and fire use), (2) livestock grazing (herbivory, trampling and associated impacts), (3) recreation, (4) mechanical treatments associated with vegetation management (including road construction, maintenance, and decommissioning), and (5) noxious weed establishment and spread. These indicators provide a relative measure of the potential for adverse effects on TEPCS plants from ground-disturbing activities that have the highest likelihood of affecting vegetative conditions or reducing populations.

The potential for adverse effects may be reduced or minimized by forest plan management direction that incorporates and implements standards, guidelines, and management area objectives to achieve desired vegetative conditions. Mitigation for all management activities and special protection measures are also discussed related to potential effects on TEPCS plants.

Affected Area

The affected areas for direct and indirect effects on TEPCS plants are the lands administered by the three National Forests. Some Management Areas may be highlighted in discussions, due to the significance of their contributions to Forest-wide populations. This is especially the case with endemic plant populations and plants at the fringe of their natural range. The affected areas for cumulative effects on TEPCS plants include national forest and other ownership lands within the Ecogroup, and also consider the natural ranges of distribution for individual plant species.

CURRENT CONDITIONS

Plant Types Within the Ecogroup

Vascular Plants

The largest and most dominant organisms within each major vegetation type are the vascular plants. They include seed-bearing plants (flowering plants and conifers) and spore-bearing plants such as ferns. They are the primary producers, utilizing photosynthesis to generate carbohydrates, which are consumed by animals and fungi. Additionally, they form the forest structure that provides substrate and habitat for other organisms, they influence microclimates, and they produce litter and decomposing wood that contributes to organic matter and soil development. Many exist in symbiotic relationships with fungi and other vascular plants, enabling some species to be non-photosynthetic, providing the capability to fix nitrogen, and other functions. In addition to their role in ecosystem functions, vascular plants provide many commercially important resources, including timber, paper, medicines, foods, and ornamentals.

Non-vascular Plants

Bryophytes - Bryophytes (mosses, liverworts, and hornworts) are small, green non-vascular plants that reproduce by means of spores instead of seeds. Although small, they play an important role in water and nutrient cycles, and provide seed beds for many plants, including western larch (Steele and Geier-Hayes 1995). Many play crucial roles in the hydrology of meadows and riparian areas. They occur in all types of environments except salt water. On the Boise, Payette, and Sawtooth National Forests, bryophytes on rock outcrops in wet meadows and fens make up a significant proportion of the biomass.

There are approximately 15,000 to 18,000 (Merrill 1995) species of bryophytes worldwide, with 1,320 species of moss (Anderson et al. 1990), and 525 species of liverworts and hornworts (Stotler and Crandall-Stotler 1977) documented in North America. No comprehensive moss flora exists for Idaho. Christy and Harpel (1997) addressed the rare and endemic bryophytes for the Columbia River Basin south of the Canadian border. They noted 50 taxa endemic to western North America. Their study found that about half the total bryoflora had fewer than five known populations. This lack of distribution knowledge hindered the development of rarity rankings and pointed to the need for systematic collecting and taxonomic studies in the interior Northwest.

Bryophyte species usually are more widely distributed than vascular plant species. However, within a broad overall range, they may occur in very localized patterns in ecologically specific habitats. Currently, four species of mosses or their habitats are considered rare on the Boise, Sawtooth, and Payette National Forests. They include: Beautiful bryum (*Bryum calobryoides*), Blandow's helodium (*Helodium blandowii*), Piper's bug-on-a-stick (*Buxbaumia piperi*), and green bug moss (*Buxbaumia viridis*). *Bryum calobryoides* was originally reported growing in springs on the Boise National Forest but attempts to relocate the site have been unsuccessful. *Helodium blandowii*, is found in peatlands and occurs on the Boise, Sawtooth, and Payette National Forests. *Buxbaumia piperi* and *Buxbaumia viridis* are known from the Payette and occur on large, decaying woody debris. *Buxbaumia piperi* was found to be more widespread than originally believed and was dropped from the ICDC rare plant list and from the analysis presented here.

Lichens - Lichens are a unique combination of two different types of organisms, fungus and alga, growing together in a symbiotic relationship. Many are sensitive indicators of air pollution, and play important roles in the cycling of water and nutrients and in relationships with many other plants and animals. Lichens are also important in soil formation. Many lichens fix nitrogen by changing atmospheric nitrogen into a chemical form that plants can use. .

The world's 18,000 to 20,000 lichen species grow on rock, soil, trees, fallen logs, and other surfaces, with about 3,330 species documented for the United States and Canada (Hale and Cole 1988). Rosentreter (1995) addressed the rare and endemic lichens for the Columbia River Basin south of the Canadian border. Herbarium collections have documented over 700 lichen species in the basin. One rare lichen species, pored lungwort (*Lobaria scrobiculata*), occurs on the Payette. It is known from the Salmon River area and occurs on trees, shrubs, and mossy rocks. *Pilophorus acicularis,* nail lichen, is found on acid rocks in sheltered, humid forests. Little is known about the overall distribution of these lichens on the Payette National Forest. It is unknown if potential habitat for these species occurs on the Boise or Sawtooth National Forests at this time.

The Idaho Conservation Data Center tracks occurrences of rare bryophytes and lichens. Moseley and Pitner (1996) list 9 rare mosses, 1 rare liverwort, and 22 rare lichens in Idaho. This list is more dynamic than the vascular rare plant lists due to recent collecting activity by biologists. Management of both lichens and bryophytes would benefit from further ecological studies and distribution data.

<u>Fungi/Cryptogamic Crusts</u>

Fungi - Fungi are members of the plant kingdom that contain no chlorophyll and rely on organic material for nutrition. They play an important role in decomposition and nutrient exchange. Some fungal species, such as the truffles, boletuses, chanterelles, and morels are important for recreational and commercial gatherers. Many fungi form symbiotic relationships, called mycorrhizal associations, with vascular plant roots underground, thus improving the ability of these vascular plants to exploit soil reserves for moisture and nutrients. Lack of knowledge on the role of fungal species in the ecosystem and difficulty of identification hinders development of species-specific management.

Cryptogamic Crusts - Another ecosystem component is the cryptogamic soil crusts, an association of algae, mosses, lichens, liverworts, cyanobacteria, and fungi that play a role in soil stabilization, nutrient cycling, soil moisture, and vascular plant interactions (St. Clair et al 1984, Eldridge 1993, Ladyman and Muldavin 1996, Quigley and Arbelbide 1997). These crusts are generally believed to protect the soil against erosion, and they affect infiltration in semiarid and arid ecosystems (Harper and Pendleton 1993, Eldridge 1993, Ladyman and Muldavin 1996, Quigley and Arbelbide 1997). Crusts are integral components of rangeland systems, and their presence is often indicative of the condition and trend of these systems (Belnap, 1994). Studies such as Kaltenecker and Wicklow-Howard (1994) on microbiotic crusts in sagebrush habitats of southern Idaho will help establish ecosystem relationships and management policies in the future. Cryptogamic crusts are often associated with potential vegetation types that include low sagebrush (includes mesic, mesic with Juniper, and xeric), salt desert shrub, big sagebrush, and juniper (St. Clair et al. 1984, Quigley and Arbelbide 1997).

Based on the analysis of potential vegetation types and cryptogamic crust development potential, completed by ICBEMP (Quigley and Arbelbide 1997), the Sawtooth National Forest has the greatest potential for crust development in the Ecogroup. The role of crusts and their distribution within the Ecogroup has not been examined in detail. To proactively address cryptogamic crusts within the Ecogroup, forest personnel will need to identify and locate areas of crust development, and areas for maintenance and restoration. The Forest Plans for the Boise, Sawtooth, and Payette National Forests (Chapter III, Forest-wide Management Direction, Botanical Resources) have an objective to promote the identification and protection of cryptogamic crusts: *Identify areas of high potential for cryptogamic crust restoration and/or maintenance*. Given the lack of current distribution data and knowledge of crust health in the Ecogroup, cryptogrammic crusts were not analyzed by alternative in this analysis. Forest personnel will be encouraged to document areas of cryptogrammic crust development and maintenance or restoration needs at the project level and in project surveys.

Selection of Species for Analysis

Forest Service botanists compiled existing information of rare or potentially rare plant species from the Intermountain Region Sensitive Species List (current and proposed, 2002), and lists maintained by the Idaho Native Plant Society and Idaho Conservation Data Center (ICDC). Current scientific literature and the ICDC provided extensive information on the biology, demography, and distribution of these plant species.

Botanists evaluated all plant species with a global (G) ranking of G1-G3, or Idaho State ranking of S1-S2. Global rankings are based on a system developed by The Nature Conservancy and used by the Natural Heritage and Conservation Data Center network. These rankings serve as a reflection of the overall status of a species throughout its global range. The system is a one-through-five ranking system, ranging from species considered globally rare (G1-G3) to those rare in Idaho (G4-G5; these are also state ranked S1 or S2). A G1 ranking refers to those species that are critically imperiled globally because of extreme intrinsic rarity or because of some factor of its biology making it vulnerable to extinction. These species typically have fewer than five viable occurrences (Idaho Native Plant Society 2000). G2 species are defined as imperiled globally because of rarity or because other factors may increase their vulnerability to extinction throughout their range (6 to 20 occurrences). G3 are those species that are vulnerable, either due to rarity or vulnerability of other factors (21 to 100 occurrences). G4-G5 species are apparently secure (usually more than 100 occurrences) but typically have concerns for long-term viability. All G1-G3 species were included in the effects analysis, unless documentation could be provided that a given species did not require sensitive status. The State of Idaho, through ICDC and the Idaho Native Plant Society, also assigns state rankings. All species ranked S1-S2 were included in the analysis. The definitions for the state rankings correspond to the global rankings.

Many species were included in the preliminary list of rare species. This list was refined to determine: (1) those species that should be included in the effects analysis, (2) additional species of concern, and (3) those species considered secure enough to drop from a list of "watch" plants. The resulting Ecogroup list (Apppendix G, Tables G-1 and G-2) comprises the best available information on rare plant species that have special management needs to ensure their long-term viability. Species needing special protection on public lands include those: 1) designated as endangered or threatened under the ESA, 2) proposed or candidate species under consideration for designation under the ESA, and 3) on the Regional Forester's Sensitive Species List.

Additional consideration regarding the management of watch species has been given since the forest plans were developed. Watch plants may not meet all criteria for being designated a sensitive species (G rank may be G4 or G5, S rank may be lower than S2), but may need to be tracked by Forests when sufficient population viability concerns exist. Each Forest maintains their own watch species list given viability concerns, high impacts, or evidence of species in decline. This list is meant to be dynamic and to provide an opportunity to track species of concern. The watch species deemed of highest concern by a team of Forest botanists and botany personnel are included in the effects analysis. All current or potential watch species are identified in Appendix G (Table G-1).

The ICDC and the Interior Columbia Basin Ecosystem Management Project (ICBEMP) identify rare and unique plant communities. More details on these communities will be presented below and in Appendix G (Table G-6 and G-7).

Threatened, Endangered, Proposed, and Candidate Plants

Federal land-managing agencies are responsible for implementing the ESA within their authorities. These responsibilities include, but are not limited to, efforts to promote the conservation and recovery of listed species, and provisions to conserve the ecosystems upon which listed species depend. The U.S. Fish and Wildlife Service (USFWS) monitors and prescribes management for federally listed threatened and endangered plant species. The National Forest Management Act and Forest Service policy require that National Forest System lands be managed to maintain populations of all existing native animal and plant species at or above minimum viable populations levels. A viable population is the maintenance of enough individuals throughout their range to perpetuate the existence of the species in natural, self-sustaining populations.

The Forest Service, in implementing the ESA, must ensure efforts to promote the conservation and recovery of listed species and provisions to conserve the ecosystems upon which listed species depend. Table B-1 provides a list of plants that have state or federal status as threatened, proposed, or candidate species. There are no plants currently listed as endangered within the Ecogroup.

Table B-1. Threatened, Proposed, and Candidate Species in the Ecogroup

Scientific Name	Common Name	Status	National Forest
Botrychium lineare	Slender Moonwort	Candidate	Sawtooth NF – Potential Habitat Boise, Payette, and Sawtooth NFs*
Castilleja christii	Christ's Indian paintbrush	Candidate	Sawtooth NF
Howellia aquatilis	Water Howellia	Threatened	Potential Habitat – Payette NF*
Lepidium papilliferum	Slick Spot Peppergrass	Proposed Endangered	Potential Habitat – Boise NF, Mountain Home District
Mirabilis macfarlanei	MacFarlane's four-o'clock	Threatened	Potential Habitat - Payette NF*
Spiranthes diluvialis	Ute ladies'-tresses	Threatened	Potential Habitat – Boise, Payette, and Sawtooth NFs*
Silene spaldingii	Spalding's Silene	Threatened	Potential Habitat - Payette NF, Boise NF*

* Indicates the USFWS removed these species from bi-annual species lists for the Forests in 2002, and has indicated there are no known occurrences on the three Forests.

Five threatened or proposed endangered species were identified within, or having potential habitat within, the Ecogroup area. These species require special management efforts and conservation needs under Forest Service Handbook guidelines (FSH 2609.25, 1988) and Forest Service Manual directives (FSM 2670), and they are examined separately from the sensitive species. For each species, detailed information regarding status, habitat information, threats, current condition, and management efforts are described below. Threats are defined as those activities, Forest Service or otherwise, or natural conditions that currently or potentially have negative effects on the viability of the TEPCS species or their habitat. Threats listed are not all-inclusive, but focus on those that have the most potential to adversely affect plant and habitat recovery, and the persistence of known populations.

Three additional species have been identified as having "special" status with the USFWS, warranting additional management effort. First, *Castilleja christii* is designated as a candidate species. Based upon its status, this species was analyzed and addressed separately from the current or proposed sensitive or watch plant species. Candidate species are those for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA.

Second, *Botrychium lineare* or slender moonwort, is a candidate species that was recently located on the Sawtooth National Forest. This diminutive fern (generally less than 5 cm tall) was discovered at nearly 3,000 meters on Railroad Ridge, Sawtooth National Recreation Area. Potential habitat may also exist on the Boise and Payette National Forests. Based upon its status, this species was also addressed separately from the current or proposed sensitive or watch plant species.

Third, *Saxifraga bryophora* var. *tobiasiae* is designated a "species of concern". Species of concern, formerly Category 2 candidates, are species identified by USFWS as having needs in land management planning and natural resource conservation efforts that extend beyond the mandates of the ESA. Based on its status, this species was analyzed with the current or proposed sensitive species but was noted here to emphasize its conservation status. The USFWS encourages conservation efforts and the formation of partnerships to preserve such species because they are by definition species that may warrant future protection under the ESA.

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's four-o'clock)-** In 1979, the USFWS listed *Mirabilis macfarlanei* as endangered. In 1996, with reclassification objectives of the 1985 recovery plan met, MacFarlane's four-o'clock was downlisted from endangered to threatened. No known sites or historic sites of this plant occur on the Payette forest, and no Forestlands were designated as critical to the recovery of the plant. *Mirabilis macfarlanei* has been on the Region 4 Sensitive Species List since 1989 because "suitable appearing" habitat was identified in the Hells Canyon area (Moseley 1989). In 1989, the USFWS added *M. macfarlanei* to the Payette National Forest 90-Day Forest-wide Species List, at which time the Forest began addressing the plant in biological assessments and Section 7 consultation. Since 1989, numerous botanical surveys have been conducted within Hells Canyon on the Payette National Forest, but no populations of *Mirabilis macfarlanei* have been located. The closest known population occurs about 35 miles downstream from the Forest boundary. The Payette National Forest is therefore recommending that the plant be removed from the Region 4 Sensitive Species List.

Habitat - This herbaceous perennial of the four-o'clock family is regionally endemic to portions of the Snake, Salmon, and Imnaha River canyons. The plant is typically found in canyon grasslands dominated by bunchgrass and shrub communities from 1,000 to 3,000 feet elevation. Nine populations occur in Idaho and Oregon, with the total population occurring in an area of 30 by 18 miles. Plants grow on all aspects but more commonly on southeast and western exposures in soils ranging from sandy to gravel and cobble. Sites are generally dry and open.

<u>Threats</u> **-** The revised recovery plan for this species lists a number of threats to habitat and populations. They include: herbicide and pesticide spraying, landslides and flood damage, insects and disease, exotic plant invasion, livestock and wildlife grazing, fire suppression and rehabilitation efforts, recreational trampling, off-road vehicles, road and trail construction and maintenance, collecting, gravel mining, competition for pollinators, and inbreeding depression.

<u>Current Management</u> **-** The current recovery plan for MacFarlane's four-o'clock does not set forth any management requirements for the Payette. In September 2002, the USFWS removed *Mirabilis macfarlanei* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest. However, the USFWS is attempting to gain additional information about the species' distribution and has asked that the Payette National Forest continue working with them on further conservation efforts (USFWS 2002, 1-4-02-SP-911).

Spiranthes diluvialis **(Ute ladies'-tresses orchid)** - Ute ladies'-tresses orchid was named in 1984 and federally listed as threatened on January 17, 1992 under the ESA. *Spiranthes diluvialis* occurs in relatively low-elevation riparian, spring, and lakeside wetland meadows in these general areas of the interior western United States: near the base of the eastern slope of the Rocky Mountains in southeast Wyoming and north-central and central Colorado; in the upper Colorado River Basin; along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah, and extreme eastern Nevada. In 1994, the range was expanded north by discoveries in central Wyoming and western Montana, and in 1996, *S. diluvialis* was discovered in southeast Idaho, along the Snake River. Reproduction is strictly sexual, with ground- and log-nesting bumblebees as the primary pollinators (Pierson and Tepedino 2000). Successful conservation of this orchid will require protecting suitable habitat and pollinator habitat in and around orchid populations.

<u>Habitat</u> **-** *Spiranthes diluvialis* is endemic to moist soils in mesic or wet meadows near springs, lakes, and perennial streams. The elevation range of known habitat is 1500 to 7000 feet. Most of the occurrences are along riparian edges, gravel bars, old oxbows, and moist-to-wet meadows along perennial streams and rivers, although some localities are near freshwater lakes or springs. *S. diluvialis* appears to be well adapted to disturbances caused by water movement through flood plains over time. It often grows on point bars and other recently created riparian habitat. The orchid appears to require permanent sub-irrigation, with the water table holding steady throughout the growing season and into late summer and early autumn. *S. diluvialis* occurs primarily in areas where the vegetation is relatively open and not very dense.

Potential habitat for *Spiranthes diluvialis* can be found throughout the Ecogroup, but no occupied habitat has yet been discovered. Populations appear to fluctuate dramatically from year to year, making it difficult to assess population status and distribution. This has held true during studies conducted on the Idaho population since its discovery. The genus *Spiranthes* also undergoes a dormant period that may last 7-10 years, apparently with no evidence of above ground structures. Nothing is known about the dormancy-triggering mechanisms. In order to locate this species, potential habitat should be surveyed every year, for 7 to10 years, before ground-disturbing activities take place.

<u>Threats</u> **–** *S. diluvialis* is found infrequently and in scattered locations. Threats include livestock grazing, exotic weed invasion, controlled flooding, dewatering of streams, loss of pollinators, and development. Because it prefers open, early seral riparian areas, its management may be in direct conflict with rare fish habitat management that emphasizes undisturbed climax conditions.

<u>Current Management</u> **-** The USFWS has prepared a draft recovery plan and developed actions designed to restore populations and remove threats. Ecogroup personnel survey potential habitat every year where ground-disturbing activities are proposed and implement appropriate mitigation measures, including stockpiling and returning topsoil, and protection of high potential habitat. ICDC is currently developing a predictive plant habitat model for the state of Idaho, which will further refine focus areas for future surveys and management. In September 2002, the USFWS removed *Spiranthes diluvialis* from the Boise, Payette, and Sawtooth National Forests' 90-Day Species List Update and noted that future biological assessments need not address the species because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts (USFWS 2002, 1-4-02-SP-911).

Silene spaldingii **(Spalding's Catchfly) -** In December 1999, the USFWS proposed to list *Silene spaldingii* as a threatened species. The final rule to list *S. spaldingii* as threatened pursuant to the Endangered Species Act of 1973, as amended, was published in October 2001 (Federal Register, Vol. 66, No. 196, 2001). Critical habitat was not included in the proposed rule. In April 2000, the USFWS proposed that designation of critical habitat was prudent. In the final listing rule (Federal Register, Vol. 66, No. 196, 2001), the US FWS determined that the designation of critical habitat is prudent for *S. spaldingii*; however, the limited budget for listing activities precluded the designation of critical habitat at this time. Potential habitat exists in the Snake River and Salmon River canyon grasslands on the Payette National Forest, and on low-elevation grasslands on the Boise National Forest. No known populations occur on the Payette, Boise, or Sawtooth National Forests.

<u>Habitat</u> **–** Spalding's catchfly, a perennial herb of the carnation family, is a Pacific Northwest regional endemic plant. The plant is typically found in mesic perennial grasslands and is known to occur in 52 populations in Idaho, Oregon, Washington, and Montana. Populations are often small and isolated. In Idaho, Spalding's catchfly appears restricted to the canyon grasslands dominated by Idaho fescue/prairie junegrass on northern aspects. Soils are generally deep to moderately deep, ranging from granitic to basalt. Most sites contain few or no shrubs or trees, but some sites have large shrub thickets, with scattered ponderosa pine or Douglas fir.

<u>Threats</u> - Section 7 guidelines for Spalding's catchfly list seven management activities that potentially threaten habitat or populations. They are grazing, recreation, fire use, exotic species, pollinator impacts, herbicide and pesticide use, and habitat conversion.

<u>Current Management</u> - Section 7 guidelines and recovery objectives have been followed where potential habitat for Spalding's catchfly occurs on the Payette National Forest. In September 2002, the USFWS removed *Silene spaldingii* from the Payette and Boise National Forests' 90-Day Species List and noted that future biological assessments need not address the species

because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that these Forests continue working with them on further conservation efforts (USFWS 2002, 1-4-02-SP-911). .

***Howellia aqualitis* (Water Howellia)** -The USFWS listed *Howellia aquatilis* (Gray) as a threatened species on July 14, 1994 (59 FR 35860). Critical habitat has not been defined or designated for *H. aquatilis* (59 FR 35860) because the USFWS does not feel it is prudent due to a possibility of increased take and vandalism. Populations of this species are currently extant in California, Idaho, Montana, and Washington. These populations are threatened by loss or change of habitat due to natural and human-induced causes. Potential habitat may exist in the oxbows and river meanders on the Payette National Forest. No known populations occur on the Payette, Boise, or Sawtooth National Forests

<u>*Habitat*</u> **-** *Howellia aquatilis* lives in shallow vernal freshwater pools of wetlands, edges of larger ponds, or river oxbows that are abandoned or still hydrologically linked to the adjacent river system. The pools are generally less than 1 meter deep, but *H. aquatilis* has been found in pools up to 2 meters in depth. The bottoms of these pools generally consist of firm, consolidated clay and organic sediments, in which *H. aquatilis* is firmly rooted. Drying of the pools in the fall is necessary for germination, and submergence in the spring is necessary for growth and flowering (Federal Register Vol. 61, No. 186, 1996, Roe and Shelly 1992).

Sites are described as being in forest openings but also surrounded by dense forest vegetation. Deciduous trees are usually found at the edges of these wet areas. The elevational range starts from the lowest in Washington at 3 meters and extends to the highest in Montana at 945 meters. *Howellia aquatilis* is not a very competitive species but it survives well in its dynamic habitat where other plants cannot (Federal Register Vol. 61, No. 186, 1996, Roe and Shelly 1992).

<u>*Threats*</u> **-** The following threats were documented in the recovery plan of water howellia (Shelly and Gamon 1996): timber harvest (siltation and hydrologic regime alteration), livestock grazing (trampling and soil compaction), non-native plant and noxious weed invasion, conversion of habitat, road construction and maintenance, military activities (in the Puget lowlands), fire effects, and natural conditions (lack of genetic variation, successional changes).

<u>*Current Management*</u> - Section 7 guidelines and recovery objectives are followed where potential habitat for water howellia occurs on the Payette National Forest. It is believed that little habitat exists for this species on the Payette National Forest. In 2001, the USFWS informed the Payette National Forest that potential habitat may occur on the Forest and added the species to the Bi-annual Forest-wide Species List. The Payette then developed a preliminary map of potential habitat for *Howellia aquatilis* and began surveying, analyzing, and addressing the plant in biological assessments. Surveys in 2001 on the Payette found no *H. aquatilis* populations. In September 2002, the USFWS removed *H. aquatilis* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Payette National Forest. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Payette National Forest continue working with them on further conservation efforts.

Proposed Endangered Species

***Lepidium papilliferum* (Slick Spot Peppergrass) -** Slick spot peppergrass, *Lepidium papilliferum*, was listed as a Candidate species on October 25, 1999 (64 FR 57533). In July 2002, the USFWS proposed to list *L. papilliferum* as endangered pursuant to the Endangered Species Act of 1973, as amended (Federal Register, Vol. 67, No. 135, 2002). The USFWS added slick spot peppergrass to the Mountain Home Ranger District, Boise National Forest 90-day species list in August 2002 (August 29, 2002 90-day species list update). At present, no known populations of slick spot peppergrass are located within the Ecogroup. Potential habitat for this species may exist on the Boise National Forest, specifically in the Lower South Fork Boise River, Arrowrock Reservoir, and Boise Front/Bogus Basin Management Areas.

<u>Habitat</u> **-** Slick spot peppergrass occurs in semi-arid sagebrush-steppe habitats on the Snake River Plain, Owyhee Plateau, and adjacent foothills in southern Idaho. Slick spot peppergrass is restricted to small depositional microsites similar to vernal pools (generally known as slick spots, mini-playas, or natric sites) that range from less than 1 square meter (m^2) (10 square feet (ft^2) to about 10 m^2 (110 ft^2) in diameter within communities dominated by other plants (Mancuso et al. 1998). These sparsely vegetated microsites are characterized by relatively high concentrations of clay and salt, and reduced levels of organic matter and nutrients compared to the surrounding shrubland vegetation. Associated species include Wyoming big sagebrush, basin big sagebrush, and bluebunch wheatgrass. The restricted distribution of the species is likely a product of the scarcity of these extremely localized, specific edaphic conditions, and the loss and degradation of these habitat areas throughout southwestern Idaho.

<u>Threats</u> **-** Slick spot peppergrass is threatened primarily by fire, the invasion of exotic plant species, livestock grazing (trampling and uprooting plants), urban development, habitat conversion, and off-road vehicle use. Because the majority of populations are extremely small, and agricultural conversion, fire, grazing, roads, and urbanization fragment existing habitat, local extirpation is a threat to this species. The limited extent of high-quality habitat for this species may not be adequate to ensure the long-term persistence of slick spot peppergrass.

<u>Current Management</u> - The most recent 90-day species list update from USFWS (dated Sept. 30, 2002) lists slick spot peppergrass on only the Mountain Home Ranger District for the Boise National Forest. Botanists are currently surveying areas of high potential habitat for this rare species.

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush)** - John Christ first collected Christ's Indian paintbrush in 1950, although it was not recognized as a new species until 1973. *Castilleja christii* is endemic to subalpine meadow and sagebrush habitats in the Albion Mountains of Idaho. After a thorough search of all potential habitats, only one population is known to exist. In 1990, the USFWS named *C. christii* as a candidate species for listing under the ESA. The Forest Service maintains it on the Regional Forester's Sensitive Species List. Steele (1980) suggested that it be listed as endangered. Moseley (1993) of the ICDC recommended *C. christii* for listing as threatened. In September 1999, *C. christii* was petitioned for listing because of immediate threats from cattle grazing.

<u>Habitat</u> - *Castilleja christii* occurs with three other rare plants in 200 acres restricted to the top of Mount Harrison in the Albion Mountains, Cassia County, Idaho. It occurs in three communities or cover types: snow bed, grassland, and sagebrush. As the density of sagebrush increases, the numbers of *C. christii* decrease. Christ's Indian paintbrush is the only yellow or yellow-orange flowered paintbrush on Mt. Harrison. It is also the only Indian paintbrush occurring in the moist snow bed and grassland communities of the summit plateau. *Castilleja christii* reproduces by seed; but nothing is known about seed dispersal or viability. It occurs almost exclusively on gentle, northerly-facing slopes underlain with quartzite of Harrison Summit and quartzite of Dayley Creek, in deep and gravelly soils.

<u>Threats</u> - *Castilleja christii* is found in only one location at the top of Mount Harrison. An estimated 23 percent of the population occurs in the Mt Harrison Research Natural Area. The largest direct loss of paintbrush habitat can be attributed to the construction of several roads, which may have affected up to 20 acres of habitat. Off-road vehicles are currently the greatest threat to the plants and the population. ORVs are restricted to the established roads, and barriers have been erected to discourage vehicles from leaving the main roads, but some off-road use still occurs. Trampling by hikers and cattle and incidental grazing by cattle are also a threat, because the stems of *C. christii* are extremely brittle during flowering, and the host species and seed dispersal mechanisms are unknown.

<u>Current Management</u> - The single known population is managed entirely by the Minidoka Ranger District of the Sawtooth National Forest. The Sawtooth National Forest signed a Conservation Assessment and Strategy in April 2002 (Pierson 2002). This agreement outlines the conservation action items to be completed by the District and partners over the next 5 years. The finalized plan will establish the Mount Harrison Botanical Special Interest Area that will incorporate the remaining 77 percent of the population and two remaining remnants of the tall forb community. The Forest Service and the USFWS are currently working together to develop and implement a Conservation Agreement that will outline the protection needs, action items, and conservation priorities for this rare species for the next 10-year period. Additionally, the USFWS is assisting the Minidoka Ranger District with an interpretive plan to increase awareness of the rare species and to promote protection and conservation among users on Mount Harrison. The main road to the lookout, which roughly bisects the population, has recently been paved. Permanent study plots adjacent to the newly paved roadway have been in place for two growing seasons and show immediate loss of individual plants next to the roadbed. Continued monitoring over the next 5 years will determine effects of increased visitor numbers, as well as the paving.

The ICDC has maintained permanent monitoring plots since 1996 and the results show a stable population until the main road was paved in 1998. The Forest Service assisted the ICDC in 2002 to learn the monitoring protocol and to install additional monitoring plots. The Forest Service has committed to completing the established monitoring for the next 5 years. Using these same plots, population stability will be monitored into the future by Sawtooth National Forest botany personnel.

Botrychium lineare **(Slender Moonwort) -** In July 1999, the USFWS was petitioned to add the slender moonwort, *Botrychium lineare*, to the List of Threatened and Endangered Plant Species. The Service published the 90-day petition finding and initiated a 12-month status review in May

2000. In June 2001, the USFWS published a finding that supported listing of the species but listing was precluded by work on higher priority listing actions, and the Service placed the species on the candidate species list (Federal Register, Vol. 66, No. 109, 2001).

In 2002, the Sawtooth Forest sent five samples for identification and species confirmation to Dr. Farrar at Iowa State University. Dr. Farrar informed the Sawtooth Botanists (Farrar 2002) that the samples morphologically look like *B. lineare* but genetically they are somewhat different than *B. lineare* known from other sites. Farrar reports that similar findings were made in a collection taken from southern Nevada in 2002. Farrar believes the Forest Service and FWS should treat them as *Botrychium lineare* but plans to do more work with this species in the future to clarify its taxonomy. *Botrychium lineare* taxonomy appears to be problematic because different sites are proving to be substantially different genetically, much more than other species of *Botrychium.* Farrar suggests the genetic variation may be attributed to the fact that they are rare and isolated. However, Farrar suggests it may also be possible that they represent different origins or possibly that they may represent more than one species. The other specimens sent in with the *B. lineare* samples were identified as *B. minganense,* not *B. lunaria* as previously believed. The unknown specimens were also identified as *B. minganense.* In 2003, Dr. Farrar hopes to visit this site and to further examine the *Botrychiums* in this area.

This population occurs on open, rocky alpine slopes of Railroad ridge at nearly 3,000 meters. This diminutive fern was located on sparsely vegetated rocky outcrops and ridgelines. Associated species included goldenrod, gooseberry, green gentian, oat grass, stonecrop, flax, silvery lupine, littlebunch lupine, mat milkvetch, little flower Penstemon, whiteleaf phacelia, prickly sandwort, paintbrush, yarrow, and sagewort.

No additional populations of this species have been located on the Boise, Sawtooth, or Payette National Forests. Potential habitat does exist on these Forests however, and efforts to examine potential habitat have been undertaken by all three Forests. In 2002, contract botanists and Forest botanists laboriously surveyed over 500 acres of potential habitat, but no new populations were located.

Habitat - The habitat for the slender moonwort has been described as “deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations” (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. Also, its current and historically disjunct distribution ranges from sea level in Quebec to nearly 3,000 meters (9,840 ft) in Boulder County, Colorado. *Botrychium* spores are small and lightweight enough to be carried by air currents. This dispersal mechanism may explain the broad and often disjunct distribution patterns exhibited by moonworts (Vanderhorst 1997).

This species is found in a variety of montane forest or meadow habitats. Three of the known Montana slender moonwort populations occur on roadsides in early seral habitat (i.e., open habitat dominated by low-growing forbs rather than shrubs or trees). Other slender moonwort sites occur in grass- to forb-dominated openings in forests characterized by cone-bearing trees such as pine, spruce, and fir species (Brooks 2000).

<u>Threats</u> – There are many threats that have been documented for the slender moonwort. They include impacts associated with recreational activities (trampling by hikers, off-road vehicle use, or pack animals), road construction, maintenance, use, and decommissioning, habitat succession, fire suppression, livestock grazing (primarily trampling and soil compaction), and non-native plant invasion. Few threats have been documented in the population of slender moonwort located on the Sawtooth National Forest. Livestock use and mining operations pose the greatest potential impacts to this population.

<u>Current Management</u> - Section 7 guidelines are followed where potential habitat for slender moonwort on the Boise, Payette, and Sawtooth National Forests exists. In 2001, the USFWS asked the Boise, Sawtooth, and Payette National Forests to consider *B. lineare* in our planning but the species was not added to the 90-Day Update of Forest Wide Species List because the distribution and habitat description were “problematic”. In response to the Service’s concern for *Botrychium lineare*, the Payette National Forest, along with the USFWS, hosted a *Botrychium* training on the Payette. Initial surveys found Least moonwort (*Botrychium simplex*) and Lance-leaved moonwort (*Botrychium lanceolatum*) on the Forest, but no *Botrychium lineare*.

In December of 2001, *Botrychium lineare* was added to 90-Day Update of Forest Wide Species Lists from the USFWS, and the Forests began addressing the species in biological assessments and consultation. In March 2002, the USFWS removed *B. lineare*, from the 90-Day Species Lists and noted that future biological assessments need not address the species under section 7 a1. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts. In 2002, the Sawtooth, Payette, and Boise National Forests completed intensive surveys in areas of high potential habitat. Given the laborious and technical nature of such surveys, a large portion of the potential habitat remains unsurveyed.

Sensitive, Proposed Sensitive, and Watch Species

Plant species are designated "sensitive" by the Regional Forester because their populations or habitats are trending downward, or because little information is available on their population or habitat trends. A six-step process is now used to determine whether a plant is designated as sensitive (USDA Forest Service 1999). The primary purpose of the Sensitive Species Program is to maintain species viability and to conserve or restore habitat conditions for these species, in order to prevent them from becoming federally listed.

The initial Intermountain Region Sensitive Plant Species List was published in 1988-1989, and later updated in 1995. New information about sensitive plant habitats, occurrence, successional relationships, potential threats, and disturbance response has become available in the last 10 years. Another revision of the list is expected in mid-2003. The list is likely to expand the number of plant species that potentially occupy habitat on the Ecogroup Forests. The number of endemics is also expected to increase. Endemic plants are defined as those that are restricted to a specific locality or region.

For the Ecogroup, 79 current or proposed sensitive species, watch species, and species of concern are identified as occurring on, or having potential habitat within, the three Ecogroup Forests. These 79 species represent the set of current or proposed sensitive species for the effects analysis presented here. Table B-2 summarizes the endemism of these species. The lifeform and taxonomic groupings of these species (along with the seven TEPC species) are summarized in Table B-3. Appendix G, Table G-1 provides a complete list of these species, their global and state status, global distribution and current and proposed forest status. Appendix G, Table G-2 provides information on habit, lifeform, population trend, and habitat.

Table B-2. Endemism and Distribution of Threatened, Proposed, Candidate, Sensitive (current and proposed) and Watch Plant Species

Endemism and Distribution	Number of Species
Endemic to National Forest Lands (all populations on FS lands)	4
Endemic to Hells Canyon, Snake and Salmon River Corridors	4
Endemic to Big Camas Prairie	2
Endemic to West Salmon River Mountains	2
Endemic to the White Cloud Mountains	1
Endemic to the Owyhee uplands and Blue Mountain Province	2
Endemic to the Stanley Basin	3
Endemic to the Raft River Mountains	2
Endemic to the Albion Mountain Range	2
Endemic to Goose Creek Drainage	2
Endemic to the Palouse Prairie	1
Endemic to the Pioneer Mountains	1
Endemic to the Rainbow Peaks	1
Found on 2 or more national forests	6

Table B-3. Lifeform and Taxonomic Groupings of Threatened, Proposed and Sensitive (current and proposed) Plant species

Lifeform and Taxonomic Grouping	Number of Species
Vascular Plants	81
Ferns	5
Perennial Herbs	48
Annual and Biennial Herbs	5
Shrubs	9
Cactus	1
Aquatic herb	1
Perennial sedge, rush,	8
Perennial grass	2
Non-vascular Plants	5
Lichens	2
Mosses	3

Several species analyzed in the draft EIS have been dropped from analysis in the final EIS. The reasons for their omissions are taxonomic changes or distributional updates. Shasta daisy (*Macheranthera shastensis*) was determined to be an invalid taxon and not rare as such. Idaho subalpine maidenhair fern (*Adiantum aleucticum*) was also determined to be an invalid taxon. Piper's bug-on-a-stick (*Buxbaumia piperi*) was found to be much more widespread that originally believed. Bronze sedge (*Carex aenea*), many-stalked clover (*Trifolium longipes*), and salmon-flowered desert parsley (*Lomatium salmoniflorm*) occurrences were misreported as occurring on the Payette National Forest. Wilcox's primrose (*Primula wilcoxiana*) is currently under evaluation for taxonomic validity.

Threats

Threats are defined as those activities, Forest Service or otherwise, or natural conditions that currently or potentially have negative effects on the viability of the TEPCS species or their habitat. To adequately address the current or potential threats to the viability of each species, they were split into three categories: (1) impacts to plants, (2) alteration of ecological factors, and (3) habitat reduction. This categorization system is adapted from the Region 4 viability module (USDA Forest Service 1999). Within each category, primary threats have been identified. For each category, a finding of no information (we found no current information of viability or threats) or no known threats (the species is not threatened by anything within that threat category) is possible.

Impacts to Plants - This category represents those activities, Forest Service or otherwise, that may have direct or indirect negative effects on current or proposed sensitive species:

- *Livestock grazing activities*, which include livestock trampling, livestock herbivory, livestock congregation, and soil disturbance and compaction, increased potential for the spread of noxious weeds, the introduction of exotic species, and changes in species composition and species density. The most significant of these documented impacts to plants due to grazing activities appears to be trampling by livestock.

- *Recreational activities*, which include hiking and associated trampling, horseback riding, hot spring use, rock climbing, ORV use, and dispersed camping;

- *Chemical treatment*, which includes application of herbicides and pesticides to manage undesired species, herbicide drift from agricultural communities, and pollinator loss due the application of insecticides;

- *Timber harvest*, which includes logging and its associated activities such log yarding, equipment storage, road construction, trailing or skidding, ground disturbance, soil compaction, micro-site alteration, and increased erosion;

- *Collection and harvesting*, both for personal and commercial use,

- *Fire suppression*, which includes both beneficial or harmful impacts to TEPCS species (Hessl and Spackman 1995) by maintaining open habitat (Jacobson et al. 1991), encouraging sexual and asexual reproduction (Popovich and Pyke 1997), reducing competition of aggressive plant species; or by preventing ecological processes necessary for TEPCS species survival, or introducing activities associated with fire suppression; for example, firelines, concentration of personnel in areas, or roads.

- *Wildlife Impacts*, which include trampling or herbivory by wildlife such as elk, deer, or bighorn sheep. Wildlife impacts have been documented as threatening several sensitive or watch species on the Forests. For example, heavy elk damage has been documented at Bowery Guard Station hot springs, one of two known sites of *Primula incana* that occur on the Sawtooth National Forest.

Appendix G, Table G-3 summarizes the impacts to plants and their associated magnitude (low, moderate, high) that are currently or potentially impacting these species.

Alteration of Ecological Factors - This category represents the conditions or activities, Forest Service or otherwise, that directly or indirectly affect the natural ecology and associated interactions of the current or proposed sensitive species:

- *Fire exclusion*, including alteration of historical fire regimes (Hessl and Spackman 1995);
- *Fire inclusion*, including direct fire impacts to species, i.e., mortality of populations;
- *Genetic impurity and genetic uniformity*, which can render populations more susceptible to disease epidemics (Falk and Hoslinger 1991), make such populations less likely to survive moderate to large-scale disturbances (Gaston 1994), and increase the potential for hybrid speciation or genetic assimilation in spatially isolated or island populations (Arnold 1997);
- *Alterations to the natural hydrologic regime*, which can range from small-scale activities such as livestock congregation to large-scale activities such as water diversions or dams;
- *Insects and diseases*, including reduction in fecundity along with insect herbivory of seeds, leaves, and stems (Silvertown 1985);
- *Loss of pollinators*, which may be needed for sexual reproduction and seed set (Tepedino et al. 1997), due to pollinator habitat reduction, pesticides, parasites, and disease;
- *Non-native species*, including competition from invasive non-native species and noxious weeds, loss of habitat, loss of pollinators, and decreased species viability;
- *Natural conditions*, for example, greater risk of extinction due to small population size, or an increase in susceptibility to stochastic events (Gilpin and Soule 1986);
- *Pollution*, including ground water contamination, air quality, and acid rain;
- *Seed bank depletion*, due to reduced fecundity, insect herbivory, loss of genetic variation, and natural catastrophic events; and

- *Succession*, including gradual changes in components, structures, processes, and their functions through successional pathways, alteration of successional pathways due to fire suppression, timber harvesting, and other land management activities, and loss of required seral stages for species survival.

Appendix G, Table G-4 summarizes the alteration of ecological factors and the magnitude associated with such changes (low, moderate, high) that are currently or potentially negatively affecting the habitat or potential of these plant species.

Habitat Reduction - The following activities may change the total availability or quality of actual or potential habitat:

- *Agriculture conversion*, including conversion of native grasslands, woodlands, or shrublands for agricultural use;

- *Energy development,* including oil and gas exploration;

- *Facilities,* including construction and maintenance of campgrounds, livestock corrals, and backcountry airstrips;

- *Military exercises,* including bombing ranges and military activities,

- *Mining*, including direct and indirect impacts associated with mining activities,

- *Road construction and road maintenance;*

- *Ski areas*, including construction and seasonal use, maintenance, expansion, and snowmaking;

- *Transmission lines,* including installation of power lines, digital cable lines, and phone lines;

- *Trail construction*,

- *Timber harvest*, including those activities that directly reduce habitat, and

- *Urban development.*

Appendix G, Table G-5 summarizes the habitat-reducing activities and their magnitude (low, moderate, high) that are currently or potentially negatively affecting the habitat or potential of these plant species.

Aggregating Threatened, Proposed, Candidate, Sensitive, Proposed Sensitive, and Watch Species by Habitat and Population Trend Groups

The 86 TEPC, current or proposed sensitive, and watch species inhabit a diverse array of habitats, vary in their distribution across the landscape, and range widely in population density. Additionally, these species are faced with a variable range of threats and differ in the degree to which Forest Service management has affected their status. The amount of current scientific information available also varies greatly among species, thus often limiting the depth of interpretation of effects of alternatives on the long-term viability of such species. To examine this wide range of species and their associated threats, species were aggregated into two logical subsets: (1) habitat groups, and (2) current population trend groups.

Habitat Groups -Forest Service botanists grouped TEPCS species into habitat groupings or habitat associations. These groupings were alpine, subalpine, forest, riparian, woodland, shrubland, grassland, and rock. Within these habitat groupings, subgroups were assigned as follows (Table B-4):

- Riparian – bogs, fens, peatlands; seasonally or vernally wet, seeps, streamside, lakeside, hot springs, aquatic;
- Forest – open gap species and understory species;
- Grasslands – high elevation, low elevation;
- Rock – cliffs, high and low elevation, talus/scree slopes, crevices or ledges, outcrops.

Table B-4. Distribution of Threatened, Proposed, and Sensitive Plant Species by Habitat Groups

Habitat Group	Number of Species*
Alpine	11
Subalpine Forest/Non-forest	11
Montane Forest	12
Open gap species	5
Understory species	7
Woodland	5
Shrubland	13
Grassland	17
High elevation	5
Low elevation	13
Riparian	23
Meadows and seeps	12
Vernally or seasonally wet	4
Bogs, fens, peatlands	7
Streamside and lakeside	5
Hot springs	2
Aquatic plants	1
Rock	19
Cliffs	4
Talus, scree, or unstable slopes	3
Crevices or ledges	5
Decomposed granitic outcrops	5
High Elevation	9
Low Elevation	10

*Species may occur in more than one habitat group, thus the total numbers within habitat groups are cumulatively greater than the total of current or proposed sensitive species.

Threats, their intensity, and the references used to determine them are presented for each species in Appendix G, Tables G-3, G-4, and G-5. Documented threats to habitat groupings and the number of species potentially impacted are summarized below in tables for each habitat group. All potential threats are not addressed here; only those documented from the current literature, professional observation, and botanical expertise are included in the tables below.

Modeled Habitat Groups - In the draft EIS, habitat groups were analyzed by using known element occurrences of sensitive, proposed sensitive, or watch species to represent the effects by alternative for each respective habitat group. This process underestimated the potential impacts that may occur within the identified habitat groups and did not truly represent the habitats that occur throughout the Ecogroup. To more adequately address the habitat groups and the potential effects by alternative in this Final EIS, vegetation and land cover classification systems using remote sensing were used to create a map of the habitat groups and their distribution on the Ecogroup. For each habitat group, the acres of classified vegetation and land cover were totaled for the Ecogroup. These habitat group acres were then examined for potential effects by alternative using a process described below in the *Measures And Factors To Assess Effects* section.

The 1998 Central Idaho Classification Project (CICP) developed at the University of Montana (Redmond et al. 1998) constructed a digital map of the existing vegetation and land cover across nearly 19.8 million acres in central Idaho based on the classification of six Landsat Thematic Mapper scenes. The CICP did not include areas south of the Snake River (Minidoka Ranger District). The Idaho Cover Classification developed by Utah State University (Homer 1998a) was used to classify the vegetation and land cover for the Minidoka Ranger District, with the exception of the Raft River Mountains, which occur in Utah. To capture the Utah vegetation and land cover data, the Utah Cover Classification developed by Utah State University (Homer 1998b) was used for the habitat groups for the Raft River Division.

Available classification categories and cover types from all data sources described above were used to create these habitat groups. A classification system was created to assign the satellite imagery to major cover types. The CICP mapped cover types into one of three levels: general group (i.e., forest), parent group (i.e., altered herbaceous grasslands), and subcode groups (i.e., non–native grasslands). The Idaho and Utah classification data (Homer 1998a, b) had much more detailed cover types, which listed principle species and many prevalent associated species. A crosswalk to ensure that appropriate cover types from each data source were placed in the appropriate habitat groups can be found in the Botanical Resources technical report (2003). The Botanical Resources technical report also includes a detailed map of the habitat groups selected and a list of the general groups, parent groups, and subgroups used to generate the habitat group acres.

Alpine (11 species) - Alpine habitats are defined as the areas above tree line in high mountains. Rocky or gravelly terrain is generally prevalent. Grasses and sedges often form thick sod-like mats in meadows. Most alpine plant species have unique adaptations to survive the harsh conditions (intense UV light, extreme temperature fluctuation, short growing season) of this habitat (Billings 1974). Many plants grow in mats or cushions. Perennials predominate in the alpine flora, as the growing season is often too short for annuals to complete their life cycles (Strickler 1990).

Although CICP (Redmond et al. 1998) included an alpine cover type (areas above tree line and alpine meadows), no acres were classified as such in the Ecogroup area. To address the alpine acres that are known to occur within this area, an alpine group was created using the following criteria: (1) areas above 2900 meters in elevation, (2) exclusion of subalpine forest/non-forestland and woodland groups that may occur above 2900 meters, and (3) exclusion of high-elevation lakes. The Idaho classification (Homer 1998a) and the Utah Classification (Homer 1998b) included high-elevation vegetation including grasses, forbs, sedges, and shrubs. The total number of alpine acres using all available data is 47,950 for the Ecogroup area.

Table B-5. Threats to the Alpine Habitat Group

Threat	Number of Species Affected (of 11)
Grazing - trampling by livestock	5
Roads	2
Mining	2
Recreation – mountain biking, hiking	2
Natural conditions (small population)	3
ORV Use	2
Non-native Plants	2

Trampling by livestock, mining, recreation (including ORV use), natural conditions, non-native plants, and roads appear to be the primary threats common to the alpine habitat group (Appendix G, Tables G-3, G-4, and G-5).

Subalpine Forest/Non-forest (11 species) - Subalpine habitats are often defined as the transitional zone between montane forests and treeless alpine regions. These regions can be sparsely forested, grasslands, shrublands, or rock regions. The subalpine flora begins about 6,000 to 6,500 feet in elevation in northern Idaho and western Montana, while much higher (9,000 to 10,500) in Colorado and Northern Utah (Strickler 1990). Subalpine forest stands often grow in patches interspersed with open meadows.

The following groups were included from the CICP for the subalpine habitat group: mesic montane parklands, subalpine meadows-grasslands; white bark pine, subalpine fir, and mixed subalpine forest (Redmond et al. 1998). The Idaho and Utah vegetation cover types included in the subalpine habitat group are alpine fir (dominated by subalpine fir) and alpine fir/lodgepole pine (Homer 1998a, b). The amount of subalpine grasslands on the Minidoka District is under-estimated here, given the classification system, but is included in the grassland habitat group. The total number of subalpine forest and non-forested acres using all available data is 1,190,707 for the Ecogroup area.

Trails/hiking (associated trampling), roads, ORV use, trampling by livestock, natural conditions, fire effects, and mining appear to be the dominant threats to the subalpine habitat group (Appendix G, Tables G-3, G-4, and G-5).

Table B-6. Threats to the Subalpine Forest/Non-forest Habitat Group

Threat	Number of Species Affected (of 11)
Grazing- trampling by livestock	6
Mining	3
Roads	5
Trails/hiking	4
ORV use	3
Fire inclusion	2
Fire exclusion	2
Non-native species	2
Plant collectors	1
Logging	1
Depletion of seed bank	2
Natural conditions	4
Trail construction	1
Genetic purity	1
Hydrologic changes	1
Urban development	1
Recreational uses-hangliding, etc.	1
Transmission lines	1

Montane Forest - The montane forest habitat group was divided into two subgroups based upon the physiognomy and disturbance dependence/tolerance of the respective species.

Montane Forest Open-gap Species (5 species) – Montane forest gap species are defined as those species that occur in natural and artificial gaps or openings within forested habitats. These species are often followers of disturbance. Many do not respond well to uncharacteristic disturbances (e.g., floods, landslides, wildfire), but do increase with infrequent, small-scale disturbances, which create small patches throughout the landscape. Species in this group thrive with periodic disturbance followed by stable conditions. Disturbance events may allow for increased light to penetrate the forest gaps and create favorable conditions for new seedling establishment. Once established, stable conditions promote the growth of the seedlings to maturity and associated reproduction. This habitat group includes forest edge species or open canopy species that occur along artificial forest margins (e.g., stabilized roadsides, skid trails).

Table B-7. Threats to the Montane Forest Open-gap Habitat Group

Threat	Number of Species Affected (of 5)
Fire exclusion	2
Roads	3
Trails/hiking	2
Herbicide drift	2
Timber harvest	3
Non-native species invasion	2
Succession	3
Fire suppression	4
Depletion of seed bank	1
Grazing-trampling by livestock	1
ORV use	1
Fire inclusion	1

Montane Forest Understory Species (7 species) – The montane forest understory habitat group is comprised of species that require protected microclimates with shade, undisturbed substrates, and associated moisture. Species are often susceptible to disturbance and are poor recruiters after disturbance. These species are often adversely affected by fragmentation, edge effects, changes in the moisture regime, and other microclimate alterations (USDA Forest Service 2000)

Table B-8. Threats to the Montane Forest Understory Habitat Group

Threat	Number of Species Affected (of 7)
Fire inclusion	4
Timber harvest	6
Alteration of hydrologic regime	1
Pollution	1
Insect/disease	1
Fire suppression	1
Succession	3
Roads-maintenance, construction	4
Grazing-trampling by livestock	2
ORV use	1
Collection/harvesting	1
Genetic purity	1
Mining	1

For the spatial analysis of the forest habitat group it was necessary to combine the forest understory group and the forest open-gap group. Given the scale of the vegetation classification using remote sensing, it was too difficult to accurately identify the fine gaps and forest openings needed for these species. The following groups were included from the CICP for the forestland habitat group: single conifer species stands (Engelmann spruce, lodgepole pine, ponderosa pine, grand fir, Douglas-fir); two-conifer species stands (Douglas-fir/lodgepole pine, Douglas-fir/grand fir, Douglas-fir/ponderosa pine); mixed whitebark pine forest; mixed mesic forest; mixed xeric forest; mixed broadleaf and conifer forest; and standing burnt or dead forest (moderate and high intensity) (Redmond et al. 1998). From the Idaho and Utah classification data the following were included: mixed lodgepole/subalpine fir, Douglas-fir, lodgepole pine (including saplings), mixed conifer/aspen, mixed spruce/fir, and mountain fir (Homer 1998a, b). The total number of forest acres using all available data is 2,685,045 for the Ecogroup area.

The threats common to the two forest habitat groups include: timber harvest, road construction and maintenance, succession, fire suppression, fire inclusion, grazing – trampling by livestock, ORV use, and fire (Tables B-7 and B-8, Appendix G, Tables G-3, G-4, and G-4).

Woodland (5 species) - Woodland habitat is defined here as the pinyon pine/juniper (*Pinus monophylla/Juniperus occidentalis*) communities found in the southern portion of the Ecogroup. The species within this habitat group are all found in open gaps interspersed within the woodland communities. These habitats are at low to mid elevations. Another woodland category, although not represented by any TEPCS occurrences, is the quaking aspen (*Populus tremuloides*) community.

The aspen group was included from the CICP in the woodland habitat group (Redmond et al. 1998). The Idaho classification data used to create the woodland habitat group included: Utah juniper, pinyon/juniper, and aspen (Homer 1998a). The Utah classification data used to create the woodland habitat group included: juniper (Rocky Mountain and Utah junipers), pinyon (Colorado and single-leaf pinyon), pinyon-juniper, and aspen (Homer 1998b). The total number of woodland acres using all available data is 180,393 for the Ecogroup.

Table B-9. Threats to the Woodland Habitat Group

Threat	Number of Species Affected (of 5)
Grazing - trampling by livestock	3
Roads	4
Mining	2
Herbicide drift	2
Non-native species invasion	3
Fire suppression	1
Seed bank	1
Collection/harvesting	1
Loss of pollinators	1
Insects/disease	1
ORV use	1
Alteration of hydrologic regime	1
Fire exclusion	1

The threats common to the woodland habitat group include: trampling by livestock, roads (construction and maintenance), non-native species invasion, mining, and herbicide drift (Appendix G, Tables G-3, G-4, and G-5).

Shrubland (13 species) - The shrubland habitat group is defined as those regions with less than 10 percent forest cover and greater than 15 percent shrub cover (Redmond et al. 1997). Mesic or xeric shrubs can dominate these regions. This habitat group includes portions of the sagebrush steppe and the Great Basin sagebrush desert (Taylor 1992). The shrubland habitat group encompasses a range of elevational distribution and may occur on a variety of substrates.

The following groups were included from the CICP for the shrubland habitat group: mesic shrubs and xeric shrubs (mountain mahogany, bitterbrush, big sagebrush steppe)(Redmond et al. 1998). The Idaho classification data used to create the shrubland habitat group included: mountain mahogany, big sagebrush, bitterbrush, low sagebrush, mountain shrub (serviceberry, chokecherry, snowbrush, currant, snowberry, scholars willow), mountain big sage, mountain low sage, and salt desert shrub (Homer 1998a). The Utah classification data used to create the shrubland habitat group included: mountain mahogany, mountain shrub (bitterbrush, serviceberry, buckbrush, chokecherry, and snowberry), sagebrush, sagebrush/perennial grass, and greasewood (Homer 1998b). The total number of shrubland acres using all available data is 1,233,648 for the Ecogroup area.

Table B-10. Threats to the Shrubland Habitat Group

Threat	Number of Species Affected (of 13)
Grazing - trampling by livestock	11
Roads	8
Mining	5
ORV use	5
Herbicide drift	7
Non-native species invasion	10
Seed bank	2
Trails/hiking	1
Insect/disease	3
Conversion to agricultural lands	4
Urban development	4
Plant collectors	3
Timber harvest	2
Fire inclusion	4
Facilities	1
Alteration of hydrologic regime	2
Fire exclusion	3
Succession	2
Genetic purity	1
Natural Conditions	1
Fire suppression	1
Military exercises	1

The threats common to the shrubland habitat group include: trampling by livestock, roads (construction, reconstruction, and maintenance), mining, ORV use, conversion of habitat to agricultural lands, urban development, plant collectors, fire inclusion and exclusion, succession, non-native species invasion, and herbicide drift (Appendix G, Tables G-3, G-4, and G-5).

Grassland (17 species) - The grassland habitat is generally defined as open and continuous area dominated primarily by many types of grass species. Grasslands are defined as regions with less than 10 percent forest cover and less than 15 percent shrub cover, with herbaceous cover greater than 15 percent (Redmond et al. 1997). Grassland habitats were divided into 2 subgroups: high-elevation and low-elevation grasslands.

Low-elevation Grasslands (13 species) – Much of the rich, low-elevational, native grasslands have been converted to agricultural lands. The remaining grasslands have many native species of the interior basin; however, many non-native species and noxious weeds have spread throughout these areas.

Table B-11. Threats to Low-elevation Grassland Habitat Groups

Threat	Number of Species Affected (of 13)
Grazing - trampling by livestock	9
Roads	8
Mining	3
Timber harvest – associated activities	5
Herbicide drift	6
Non-native species invasion	7
Conversion to agricultural lands	4
Insect/disease	3
Seed bank	1
Plant collectors	3
Urban development	2
ORV use	4
Succession	1
Fire suppression	4
Fire inclusion	3
Fire exclusion	2
Hiking/trampling	2
Natural conditions	3
Loss of genetic purity	1
Alteration of hydrologic condition	3
Loss of pollinators	1

High-elevation Grasslands (5 species) – In high-elevation grasslands, drainage patterns and moisture regimes allow for the establishment of many species not found in lower-elevation grasslands. The vegetation can differ greatly from drier, lower sites and include many species of sedges, grasses, rushes, and tall forbs. These high-elevation areas are often used for grazing livestock later in the growing season, which may overlap with plants that are phenologically active later in the year.

Table B-12. Threats to the High-elevation Grassland Habitat Group

Threat	Number of Species Affected (of 5)
Grazing - trampling by livestock	3
Alteration of hydrologic regime	2
Timber harvest – associated activities	3
Fire suppression	1
Roads	3
Fire exclusion	1
ORV use	2
Succession	1
Recreational use- ie. Hang-gliding	1
Hiking/trampling	2
Fire inclusion	4
Transmission lines	1
Natural conditions	1
Non-native plants	3
Herbicide drift	1

Given the large spatial scale of the vegetation classification, the high-elevation and low-elevation grassland groups were aggregated for this analysis. Many of the grassland and meadows included in this habitat group are surrounded by forest vegetation or encroaching forest vegetation; therefore some of the threats associated with timber harvest and mechanical activities are presented here. The following groups were included from the CICP for the grassland habitat group: upland grasslands and altered herbaceous grasslands (Redmond et al. 1998). The Idaho classification data used to create the grassland habitat group included: annual grass/forb, dry meadow, perennial grasslands (dominated by seeded grass species, e.g., crested wheatgrass), perennial grass slope (e.g., bluebunch wheatgrass, Idaho fescue, junegrass), and perennial grass montane (Homer 1998a). The Utah classification data used to create the grassland habitat group included: grassland (perennial and annual grassland), dry meadow, wet meadow, and desert grassland (Homer 1998b). The total number of grassland acres using all available data is 172,006 for the Ecogroup area.

The threats common to the two grassland habitat groups include: trampling by livestock, roads (construction, reconstruction, and maintenance), activities associated with timber harvest, non-native plants, fire (inclusion and exclusion), ORV use, hiking/trampling, herbicide drift, succession, fire exclusion and inclusion, alteration of hydrologic condition, and insect/disease (Tables B-11 and B-12; Appendix G, Tables G-3, G-4, and G-5).

Riparian (22 species) - Riparian habitats are generally defined as those regions connected with or immediately adjacent to banks of streams, rivers, or other bodies of water, or having a moisture regime that promotes the establishment of species adapted to such environmental conditions. The riparian habitat was divided into several subgroups to adequately address the threats unique to each group. The riparian species fall into Riparian Conservation Areas (RCA), which are site-specifically determined corridors along streams (forested, non-forested, intermittent), and lakeshores, and include ponds, reservoirs, and wetlands. These RCAs are specially managed to protect aquatic and riparian resources.

Meadows and Seeps (11 species) - Meadows and seeps are wet openings that contain grasses, sedges, rushes, and herbaceous forbs that thrive under saturated or moist conditions. These habitats can occur on a variety of substrates and may be surrounded by grasslands, forests, woodlands, or shrublands (Skinner and Pavlick 1994).

Table B-13. Threats to the Meadow and Seep Habitat Group

Threat	Number of Species Affected (of 11)
Grazing - trampling by livestock	8
Alteration of hydrology	9
Roads	3
Mining	1
ORV use	1
Fire exclusion	1
Non-native species invasion	3
Herbicide drift	2
Conversion to agricultural lands	3
Fire inclusion	1
Loss of genetic purity	2
Loss of pollinators	1
Recreational uses	1
Timber harvest –associated activities	1
Urban activities	1

Vernally Wet (4 species) - Vernally or seasonally wet habitats are depressions or swales with relatively impermeable soil that accumulate seasonal precipitation and run-off. These areas slowly dry up as temperatures increase through the season. Vernal pools and depressions in sagebrush scrub communities are included in this habitat. Annual herbs and grasses adapted to saturated conditions and early growth under water are predominant (Skinner and Pavlick 1994).

Table B-14. Threats to the Vernally Wet Habitat Group

Threat	Number of Species Affected (of 4)
Grazing - trampling by livestock	4
Alteration of hydrology	4
Roads	2
Timber harvest – log decks	2
Urban development	1
Herbicide drift	2
Conversion to agricultural lands	2
Fire inclusion	1
Loss of genetic purity	2
Natural conditions	3
Non-native plants	3
Loss of pollinators	1
Seed bank	1
Succession	1

Bogs, Fens, and Peatlands (6 species) – Bogs and fens are wetlands that typically have sub-irrigated cold water sources. Peatlands are generally defined as wetlands with waterlogged substrates and at least 30 centimeters of peat accumulation (Moseley et al. 1994). The vegetation within these habitats is often dense and dominated with low-growing perennial herbs (Skinner and Pavlick 1994). The Forest Service manages a high proportion of the valley peatlands in Idaho, primarily in the Sawtooth Valley.

Table B-15. Threats to the Bog and Fen Habitat Group

Threat	Number of Species Affected (of 6)
Grazing - trampling by livestock	5
Alteration of hydrology	5
Roads	1
Facilities	1
Plant collectors	2
Wildlife impacts	1
Timber harvest	1
Fire suppression	1

Streamside and Lakeshore (4 species) - The streamside and lakeshore habitat group includes those species that grow in open habitats along the margins of streams, natural lakes, and reservoirs, and can occur within grasslands, shrublands, woodlands, and forested regions. Species in this group are vulnerable to recreation and livestock impacts to these water sources.

Table B-16. Threats to the Streamside and Lakeshore Habitat Group

Threat	Number of Species Affected (of 4)
Grazing - trampling by livestock	3
Alteration of hydrology	4
Recreation – hiking/trampling	2
Roads	2
Non-native species	2
Fire exclusion	1
Herbicide drift	2
ORV use	1
Conversion to agricultural lands	1
Urban development	1
Loss of pollinators	1
Recreational uses	1
Timber harvest	1
Facilities	1
Insect/disease	1

Hot springs (2 species) – Many naturally occurring hot springs occur throughout the Ecogroup area. These hot spring communities are generally comprised of hummocks of vegetation that are perennially moist from contact with a constant flow and temperature of clean water. Such hot spring habitats are generally localized along larger watercourses with various types of riparian vegetation (Mancuso 1991). Species in this group are vulnerable to recreation due to hot springs use, wildlife impacts, and livestock impacts to these water sources. Human use of hot springs has greatly increased in the past few years. All three Forests have documented disturbance and impacts to plant in the populations that occur in the natural hot springs.

Table B-17. Threats to the Streamside and Lakeshore Habitat Group

Threat	Number of Species Affected (of 2)
Grazing - trampling by livestock	2
Alteration of hydrology	2
Recreation – hiking/trampling	1
Roads	1
Non-native species	1
Wildlife impacts	1
Facilities	2
Insect/disease	1
Collection/harvesting	1
Timber harvest	1
Recreational uses	1

<u>*Aquatic plant species (1 species)*</u> – Aquatic plant species can occur in shallow vernal freshwater pools of wetlands, edges of larger ponds, or river oxbows that are abandoned or still hydrologically linked to the adjacent river system. Species in this group are vulnerable to recreational impacts due to changes in hydrologic regime, successional changes, and trampling by livestock and wildlife. Soil compaction in aquatic systems can prevent aquatic species from establishing and surviving.

Table B-18. Threats to the Aquatic Plant Habitat Group

Threat	Number of Species Affected (of 1)
Grazing - trampling by livestock	1
Alteration of hydrology	1
Roads	1
Non-native species	1
Loss of genetic purity	1
Natural conditions	1
Seed bank depletion	1
Succession	1

<u>*Aquatic (Open water)*</u> - The CICP (Redmond et al. 1998), Idaho classification (Homer 1998a) and Utah classification (Homer 1998b) data included cover types for water throughout the Ecogroup. The water cover type from the CICP was included for the aquatic habitat group. The open water cover types were included from the Idaho and Utah classification data. The total number of aquatic (open water) acres using all available data is 29,626 for the Ecogroup area. The effects to the aquatic habitat subgroup are aggregated with the riparian habitat group to more accurately reflect activities that may impact aquatic plants.

Given the large scale of the classification data, the six riparian habitat types were aggregated into one riparian habitat group for spatial analysis. The following parent groups were included from the CICP for the riparian habitat group: conifer-dominated riparian, broadleaf-dominated riparian, mixed tree riparian, graminoid and forb-dominated riparian, and shrub-dominated riparian (Redmond et al. 1998). The Idaho classification data used to create the riparian habitat group included: deciduous tree riparian, riverine riparian (mixed conifer and shrub dominated), herbaceous riparian (sedges and forb species), shrub riparian, deep marsh, shallow marsh, and mud flat (Homer 1998a). The Utah classification data used to create the riparian habitat group included: mountain riparian (above 5500 feet) and lowland riparian (below 5500 feet) (Homer 1998b). The total number of riparian acres using all available data is 119,846 for the Ecogroup. The threats common to the six riparian habitat types include: trampling by livestock, alteration of hydrology, and roads (construction, reconstruction, and maintenance) (Tables B-13, B-14, B-15, B-16, B-17, and B-18; Appendix G, Tables G-3, G-4, and G-5).

Rock (19 species) - A variety of rock habitats occur throughout the region. The Ecogroup area overlies a major portion of the Idaho Batholith. Thus, many species are endemic to the rock outcrops and talus slopes created by this geological formation (Ertter and Moseley 1992). The rock habitat group has been divided into four main subgroups: cliffs; talus, scree, or unstable slopes; rock crevices and ledges; and decomposing granitic outcrops. Each of the main subgroups has been divided into high- and low-elevation groupings.

Cliff (4 species) – Cliff habitats are defined as steep rock faces, with fissuring, drainage, and aspect characteristics that support plant establishment and growth. Species within this habitat group can be found on a wide range of rock types and elevations. Of the cliff species, three occur at low elevations and one occurs at high elevation.

Table B-19. Threats to the Cliff Habitat Group

Threat	Number of Species Affected (of 4)
Mining	1
Roads (reconstruction, construction)	3
Recreational uses	1
Rock climbing	1
Pollution – dust from recreational roads	1
Insects/disease	1
Herbicide drift	2
Non-native plants	1
Natural conditions	1

Talus, Scree, and Unstable Slopes, (5 species) – Talus slopes are defined as topographic irregularities covered with coarse gravel or boulders. These slopes tend to be unstable thus favoring the establishment of a particular combination of plants. The moisture regime for these rocky habitats is generally dependent upon channeling of precipitation and melt-water run-off.

Low-elevation Talus, Scree, and Unstable Slopes (3 species) – In this rock habitat subgroup, elevation ranges from 1900 feet in the Hells Canyon area to just below 6,500 feet. These areas can be affected by road construction and are sometimes used for roadbed or log deck material, borrow pits, and landscape rock.

High-elevation Talus, Scree, and Unstable Slopes (2 species) – In this rock habitat subgroup, elevation ranges from 6, 500 to upwards of 10,000 feet. These areas are often adversely affected by recreational activities, high elevation livestock use when plants are phenologically active, and natural conditions.

Table B-20. Threats to the Talus, Scree, and Unstable Slopes Habitat Groups

Threat	Number of Species Affected (of 5)
No Information currently on threats	5

Decomposed Granitic Outcrops (5 species) - Rock outcrop habitats are composed of unweathered or slightly weathered bedrock with plants establishing in small pockets of soil or between rock crevices. Three of the granitic outcrop species occur at low elevation and all are endemic to the Stanley Basin. The other two granitic outcrop species occur at high elevation.

Table B-21. Threats to the Decomposed Granitic Outcrop Habitat Group

Threat	Number of Species Affected (of 5)
Grazing - trampling by livestock	4
Roads (construction, reconstruction)	3
Hiking/trampling	3
Urban development	3
ORV Use	2
Herbicide drift	2
Mountain biking	2
Seed bank	2
Fire inclusion	1
Natural conditions	2

Rock Crevices and Ledges (6 species) - Five of the rock crevice and ledge species occur at high elevation, and one occurs at low elevation. Rocky areas and ledges can be of sedimentary, igneous, or metamorphic rock. These species are usually adapted to high ultra violet light, rapid spring runoff, and temperature extremes.

Table B-22. Threats to the Rock Crevice and Ledge Habitat Group

Threat	Number of Species Affected (of 6)
Grazing - trampling by livestock	1
Natural conditions	1
Mining	1

Given the fine scale of the rock habitat types and the large scale of the classification data, the four rock habitat types were aggregated into the rock habitat group for spatial analysis. The following groups were included from the CICP for the rock habitat group: rock dominated sites (exposed tock) and barren areas (Redmond et al. 1998). The rock cover type (rock or talus with less than 5 percent vegetative cover) was included from Idaho classification data (Homer 1998a). The Utah classification data used to create the grassland habitat group included: barren cover type (sand, rock, salt flats, playas, and lava) and pickleweed barrens (mosaic of sparsely vegetated and barren playa flats) (Homer 1998b). The total number of rock habitat acres using all available data is 274,755 for the Ecogroup area.

The threats common to the four rock habitat types include: mining, roads (construction, reconstruction, and maintenance), herbicide drift, natural conditions, and recreation (Tables B-19, B-20, B-21, and B-22; Appendix G, Tables G-3, G-4, and G-5).

Population Trends

Current population trends were assessed from existing scientific literature, data maintained by the ICDC, and botanical expertise. Population trend information was organized into four categories: (1) stable on National Forest System (NFS) lands, (2) declining on NFS lands, (3) increasing on NFS lands, or (4) population trend unknown. Forests are required to supply trend data as part of the six-factor evaluation form for revising the Regional Sensitive Species List (USDA Forest Service 1999). The population trend of the 79 sensitive (current or proposed) or watch species and 7 threatened, proposed, and candidate species was determined through literature searches, expert advise, scientific reports, conversations with ICDC, and professional experience and judgment with these species. Currently, 47 species (55 percent of the total current and proposed sensitive plant species) are thought to have stable population trends on NFS or other lands (Appendix G, Table G-2). Table B-23 summarizes those species (13 species) that are apparently declining on NFS or other lands and the habitat group or groups to which they belong. Appendix G, Tables G-3, G-4, and G-5 summarize those current or potential threats or factors (natural, management, or otherwise) that may be contributing to the decline of these populations. No TEPCS species were found to have an increasing trend.

Table B-23. TEPCS Plant Species with a Declining Trend on NFS Lands

Species Name	Common Name	Habitat Group(s)
Astragalus anserinus	Goose Creek Milkvetch	Woodlands - open-gap species
Astragalus atratus var. *inceptus*	Mourning Milkvetch	Shrublands
Bryum calobryoides	Beautiful Bryum	Riparian
Ceanothus prostratus var. *prostratus*	Mahala-mat Ceanothus	Forest – open-gap species
Crepis bakeri spp. *paddoensis*	Idaho Hawksbeard	Grassland, alpine
Eatonella nivea	White eatonella	Shrubland
Epipactis gigantea	Giant Helliborne orchid	Aquatic/riparian – seeps/springs
Lepidium papiliferum	Slickspot Peppergrass	Shrubland - low elevation
Phacelia minutissima	Least Phacelia	Shrubland, Woodland, riparian
Primula incana	Silvery/Jones' primose	Riparian – meadow, seeps
Rhynchospora alba	White beakbrush	Riparian – bogs, fens
Salix farriae	Farr's willow	Riparian – streamside, subalpine
Silene spaldingii	Spalding's silene	Grasslands

For many of the sensitive species, little to no current information is known concerning biology, threats, or population trends. Table B-24 summarizes those species (26 species) in which too little is currently known about the species or its populations to determine its trend on NFS lands.

Table B-24. TEPCS Plant Species for Which Population Trend is Currently Unknown

Species Name	Common Name	Habitat Group(s)
Arabis falcatoria	Grouse Creek rockcress	Rock – rock outcrops, talus
Argemone munita	Armed prickly poppy	Woodland – open-gap species
Astragalus aquilonius	Lemhi milkvetch	Rock
Astragalus paysonii	Payson's milkvetch	Forest – open-gap species
Astragalus vexilliflexus *var.* nublis	White Cloud milkvetch	Subalpine
Botrychium campestre	Prairie moonwort	Grasslands
Botrychium lanceolatum	Lance-leaf moonwort	Forest-understory
Botrychium lineare	Slender moonwort	Alpine, grassland, talus, Forest
Buxbaumia viridis	Green's bug-on-a-stick	Forest – understory species
Carex aboriginum	Indian Valley sedge	Riparian-wet meadow, sagebrush
Carex buxbaumii	Buxbaum's sedge	Riparian-meadow
Cryptantha propria	Malheur cryptantha	Grasslands
Cypripedium fasciulatum	Clustered lady's-slipper	Forest-understory
Draba incerta	Yellowstone draba	Subalpine/alpine
Eriogonum desertorum	Desert buckwheat	Rock – outcrops
Howellia aquatilis	Water Howellia	aquatic
Pilophorus acularis	Nail lichen	Rock-talus
Poa abbreviata ssp. marshii	Marsh's bluegrass	Alpine
Polystichum krukebergii	Sword fern	Rock, subalpine
Salix glauca	Gray willow	Riparian – streamside, subalpine
Sanicula graveolens	Sierra sanicle	Rock - outcrops
Sedum borschii	Borch's stonecrop	Rock – talus/scree slopes
Silene uralensis spp. *montana*	Petal less campion	Alpine
Sphaeromeria potentillodies	Cinquefoil tansy	Riparian - wet meadow
Stylocline fiaginea	Stylocline	Grasslands
Triantha occidentalis ssp. *brevistyla*	Short-style tofeldia	Riparian – meadows, seeps

Rare and Unique Communities

A plant community is recognized as a repeating assemblage or grouping of plant species on the landscape (Winward 2000). Some classification systems refer to a plant community as the existing vegetation that currently occupies a site, whereas others use the potential vegetation that reflects the climax community at that site. Classifications based on existing vegetation may describe different seral stages as different communities, whereas those based on potential vegetation may include a variety of disturbance-induced or seral plant communities, but the climax community remains the same (Steele et al. 1981). The list of rare and unique communities within the Ecogroup was generated through lists developed by the ICBEMP and the ICDC, and included review and input by botanists and ecologists from the National Forests and State of Idaho. Because these different sources use different methods for defining a community, we did not distinguish between existing and potential communities to ensure that we could compile the most comprehensive list. In all, 42 rare communities that occur within the Ecogroup boundaries were identified.

Global rankings are assigned by the network of Natural Heritage Programs and Conservation Data Centers. All global rankings of G1-G3 were included on our list. These rankings were described above.

As mentioned above, some of these communities are intrinsically rare, whereas others may be affected by other factors, or some combination of the two. For example, the grand fir/ pacific yew (*Abies grandis/Taxus brevifolia*) community is an example of a community that has been reduced due to management activities and alteration of successional pathways. This late-seral forest community is a relatively uncommon community that naturally depends upon a long fire return interval and has been reduced by logging and harvesting of yew bark. There are currently fewer than 200 occurrences in the Western United State (Reid et al. 1999). Another example is the ponderosa pine/snowberry (*Pinus ponderosa/Symophoricarpos oreophilis*) community. This community is locally abundant with the Ecogroup but few quality, representative stands are known outside of this region. In addition to the western Boise mountains of Idaho, there are a few, highly dispersed and geographically separated, stands in the Seven Devils and the Aquarius Plateau and Abajo Mountains of Utah. This community is declining due to landscape-scale disruption of natural fire disturbance patterns and process (Reid et al. 1999).

Threats to the 42 identified communities (Appendix G, Table G-6) include management activities such as timber harvest, road construction, exotic species introduction, landscape fragmentation, livestock grazing, hiking, and altered fire disturbance regimes. Of the 42 rare communities identified for the Ecogroup, 11 currently have declining trends on NFS lands (Appendix G, Table G-6). For 22 rare communities, the trend is currently unknown within the Ecogroup (Appendix G. Table G-6). The remaining 9 communities have stable trends on NFS Lands (Appendix G. Table G-6).

The complete list of the 42 rare and unique communities identified for the Ecogroup, the global and state rankings, rarity class, most prevalent threats, trends, and distribution on National Forest lands within the Ecogroup are presented in Appendix G, Table G-6. An additional table has been added in this final EIS to explain the reasons for the rarity ranking and distribution information in Appendix G, Table G-7. Also, those communities found within Research Natural Areas (RNAs) are listed in Appendix G, Table G-6.

Potential Habitat

The Ecogroup has defined desired conditions for vegetation, based on an array of potential vegetation groups (PVGs) for forested vegetation (See *Vegetation Diversity* section). PVGs, which are groupings of habitat types, share similar environmental characteristics and site productivity. Within each PVG, a historical range of variability (HRV) is described, which represents the range of naturally occurring composition, structure, density, and ecological processes. This will vary for different PVGs because of the differences in environmental characteristics and site productivity. For non-forested vegetation (shrublands and grasslands), desired conditions are based on the density and size class elements of cover types. Cover types are based on the existing vegetation that occupies the site at this time, which may approximate the dominant climax vegetation. It is inclusive of variations due to management activities in those types. Community types describe riparian areas, which are consistently under the influence of disturbance processes. These community types represent existing community structure and composition, with no indication of successional status or relationship to temporal setting (Padgett et al. 1989). They can be aggregated into broader life form categories more applicable to analysis at Forest-wide levels. Therefore, for different vegetation groups, the desired conditions are based on the HRV for those groups.

There may be TEPCS or rare plants that exist on the Forest, but their actual occurrences and spatial locations are unknown at this time. However, by providing vegetation components at amounts and distributions similar to those that existed historically, and by maintaining or restoring the ecological processes that support these vegetation components, overall biological diversity should also be provided to sustain rare individuals.

Traditional and Cultural Species of Interest to American Indians

Throughout history, native plants have developed cultural significance with many human groups. Plants provide food, fiber, medicine, ceremonial, commercial, and other uses, many of which remain important today. The cultural uses of native plants and their associated communities often contributed to settlement and land use patterns. The users of these products hold considerable natural resource knowledge, including a variety of management techniques to foster the production and quality of certain plants. This knowledge continues to gain important recognition in managing public lands. Appendix G, Table G-8 contains a list of plant species known to have cultural significance to Native American Indians and other users of the Ecogroup. This list was compiled using a variety of sources including ICBEMP (Croft et al. 1997), sources from other National Forests, the Nez Perce Tribe, and consultation with Forest Archeologists.

Special Forest Products

Special forest products are defined as “non-timber, renewable, vegetative natural resources that can be utilized either for personal or commercial use.” They include mosses, lichens, ferns, pine cones, Christmas boughs, Oregon grape, wildflowers, mushrooms, huckleberries, osha (*Ligusticum*), St. John’s wort (*Hypericum*), beargrass (*Xerophyllum tenax*), cacti, sagebrush, balsam root (*Balsamorhiza sagittata*), parts of woody plants, and many more medicinal and ornamental species. The term “miscellaneous forest products” is reserved for timber-related products.

There is increasing recognition of the economic value of special forest products and their potential role in supporting diversification of forest-product dependent communities. The long-term strength of the industry depends on the sustainability of the resources being harvested, so this issue is closely linked to ecosystem health. Many National Forests across the United States have established Forest-wide direction for special forest products in order to ensure sustainable harvest, to track demand for these products, and to monitor impacts of harvest.

In the past, collection of special forest products on a commercial scale in the Ecogroup has been limited primarily to mushroom harvest after wildfire. However, increasing demand nation-wide for a variety of species has led to an increasing number of inquiries about commercially desirable species available on Ecogroup lands. These include seeds of native species, roots and leaves of native and exotic species for medicinal purposes, and species used in the floral industry.

Unregulated or excessive harvest of special forest products could remove plants at a rate that exceeds growth and reproductive capabilities, resulting in declining species abundance and viability, overall impacts to the ecosystem, and a shift in plant communities and species diversity across the landscape.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Measures

Laws, Regulations, and Policies - Threatened, endangered, proposed, or candidate species have special management requirements for all Forest Service management activities. Conservation Assessments, Strategies, and Agreements, along with Recovery plans (described above), currently established for the these plant species within the Ecogroup will be met and upheld to ensure the viability and conservation of these species.

For sensitive species, management efforts to ensure their population viability and preservation are already in place. The Forest Service management policy (FSH 2609.25, 1.25, 1988 and FSM 2670) ensures that for all TEPCS plant species, the following measures will be taken: (1) biological evaluations will be written for all activities that may affect sensitive species and their habitat, (2) "effects" of activities will be determined as similar to those for threatened, endangered, or proposed species, and (3) special management emphasis will be included in all management activities to ensure the viability of the Sensitive species and to preclude trends toward endangerment that would result in the need for federal listing. This Forest Service management policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved.

Forest Plan Direction and Implementation - Determining the overall effects of management activities on TEPCS plant species and rare plant communities at the Ecogroup level has inherent risks and uncertainty. Many of the species analyzed in the effects analysis presented here may be beneficially or detrimentally affected by the activities emphasized by each MPC for each alternative. Rare communities, not unlike rare species, may also increase or decrease in abundance or quality based upon activities associated with alternative emphasis or prescription categories. To ensure the viability and conservation of all plant species, the following mitigation measures would be implemented at the appropriate scale for all action alternatives. These measures, including specific standards and guidelines, are to be used in analysis, implementation, and monitoring of projects, for determinations of the effects of management actions on TEPCS species. Additionally, these measures strive to maintain or restore the distribution of native plant communities and special habitat features within the Ecogroup.

Detailed goals, standards, and guidelines for botanical resources that focus on maintaining population viability, ecological processes, and native plant communities are outlined in the Botanical Resources section of the Forest-wide Management Direction in Chapter III of the revised Forest Plan for each Forest of the Ecogroup.

<u>*TEPCS Species Protection*</u> - For all TEPCS plant species within the Ecogroup, Forest-wide management direction has been developed and would be implemented under all action alternatives, except alternative 1b. The No Action Alternative—1B—would be implemented under current plan direction, not revised direction. Additional revised direction to the current plans to would have to be added to ensure an equivalent level of protection. This direction is in Chapter III of the revised Forest Plans and includes the following:

- Globally rare plants (plants identified as the Natural Heritage Program as G1, G2, and G3 and/or S1 and S2 species) will be maintained and restored, along with provisions for their continued compositional and functional integrity for those species for which we have habitat.

- Conservation and recovery of all federally listed species, Region 4 sensitive (current or proposed), Forest “watch” plants and species at risk where quantity and quality of habitat needed to support viability is a concern.

- Management actions that occur within occupied TEPSC plant species habitat will incorporate measures to ensure habitat is maintained where it is within desired conditions, or restored where degraded

- Surveys will be conducted according to Forest Service Handbook guidelines in FSH 2609.25 (1988) and Forest Service Manual (FSM 2670) prior to completion of NEPA analysis.

- Sensitive species habitat will be identified and prioritized for opportunities to restore degraded Sensitive species habitat during fine scale analyses.

- Signed Conservation Assessments, Strategies, Agreements and Forest Service approved portions of approved Recovery Plans will be implemented for TEPCS species.

- Collection of TEPCS plant species will be for research or scientific purposes only, and conducted under the direction of the Forest or Regional Botanist.

- Forest Botanists should prepare Conservation Assessments, Agreements, and Strategies to maintain or restore habitats of sensitive plant species, as a means of proactive management.

- Suitable occupied and unoccupied habitat should be defined for TEPCS plant species by mapping locations and describing the habitat requirements necessary for the maintenance of viable populations. Rationale for not conducting surveys for other species will be documented in the project record.

- Integrated weed management should be used to maintain or restore habitats for TEPCS plants and other native species of concern where they are threatened by noxious weeds or non-native plants.

- Mitigation will be designed and implemented for projects that have degrading effects on TEPSC plant species – e.g. application of insecticides, herbicides, fungicides, or rodenticides.

- Forest botanist shall be consulted to ensure appropriate species are used in revegetation and seeding projects in occupied TEPSC plant habitat.

Rare Plant Communities - Globally rare communities should be surveyed and mapped when and where possible. This information will be coordinated with the ICDC (Chapter III, revised Forest Plans). Botanical Special Interest Areas (areas that include unique habitat features, rare plant communities, and high-quality unique vegetation) should be identified and recommended for establishment (Chapter III, revised Forest Plans). Throughout the Forests, unique assemblages of rare plant species, valley peatlands, tall forb communities, etc. should be maintained or restored (Chapter III, revised Forest plans).

Plant Communities - Plant community habitats (i.e., riparian, wetland, and upland forest, shrub, valley peatlands, and grassland habitats) should be managed to provide for the desired amount, quality, and distribution of habitats, reduced fragmentation within habitats, juxtaposition and connectivity to other habitats, and ecosystem processes that shape habitat (Chapter III, revised Forest Plans).

Non-Vascular Plants **-** Surveys should be conducted for bryophytes, lichens, and fungi with poorly known ranges to determine distributions, abundance, threats, and when necessary, appropriate levels of protections. Additionally, those areas with high quality cryptogamic soil crusts with lichens, bryophytes and fungi should be identified and recommended for establishment as Botanical Special Interest Areas (Chapter III, revised Forest Plans).

Pollination **–** Specific goals and guidelines have been designed to address pollination ecology and to attempt to reduce pollinator losses. Habitats for plants that provide nectar and pollen will be maintained throughout the season when pollinator species are active, with emphasis on rare plant species (Chapter III, Forest Plans). To minimize harm to TEPCS plant species, the Forest Botanist should review annual insecticide or herbicide spray plans and prescribed burning plans (Chapter III, revised Forest Plans). Examples of additional mitigation efforts include: (1) no application of insecticides and herbicides during the flowering period of any known TEPCS plant populations and surrounding areas and (2) the seasonality of prescribed burning plans should be reviewed by Forest botanists to minimize harm to TEPCS species and their pollinators. Research efforts for Sensitive plant species to determine habitat dynamics, seral conditions, pollination ecology, phenology, distribution, and susceptibility to impacts will be coordinated with Idaho Conservation Data Center, universities, and Forest Service Research Stations (Chapter III, revised Forest Plans). Many conservation assessments and recovery plans of TEPCS species also include detailed guidelines for the preservation of pollinator habitats and resource needs.

Inventory and Monitoring **-** Suitable occupied and unoccupied habitat should be defined for TEPCS plant species by mapping locations and describing the habitat requirements necessary for the maintenance of viable populations. Surveys will be conducted by Forest botanists, or botanical personnel under their direction, to identify TEPCS plant species and their habitats. Surveys and mapping efforts for rare communities will also be completed when possible. Information will be incorporated in a GIS database and will be shared with the ICDC (Chapter III, revised Forest Plans).

Conservation Assessments, Agreements, Strategies, and Recovery Plans often include very detailed inventory and monitoring schedules and guidelines for TEPCS plant species. These inventory and monitoring plans will be met and upheld in the implementation of all current and future Conservation Assessments, Agreements, Strategies and Forest Service approved portions of Recovery Plans.

Monitoring and evaluation programs for Botanical Resources are outlined in Chapter III of the revised Forest Plans. Inventory and monitoring activities are essential to provide information that will allow managers to maintain and promote the biological and ecological needs of TEPCS plant species and to ensure the viability of these populations.

Traditional and Cultural Species of Interest to American Indians **-** The gathering of plants for American Indian ceremonial or medicinal uses are provided for through the existing treaties with the U.S. Government and will be coordinated through the Forest Supervisor (Chapter III, Forest Plans). Additionally, Forest botanists should identify those plants associated with traditional uses (sustenance, medicine, ceremony, etc.) along with those areas that are culturally significant to Native American communities (Chapter III, revised Forest Plans).

Collection and Harvesting **-** Specific standards and guidelines in the revised Forest Plans have been designed to address the impacts of collecting and harvesting. As stated above, collection of TEPCS plant species will be for research or scientific purposes only under Forest Service direction. In cases where collecting permits are issued, digging or physically removing whole plants will be discouraged in favor of collecting seeds or cuttings (Chapter III, revised Forest Plans).

Revegetation - The need to utilize native plants in revegetation and restoration projects is emphasized. Forest personal will cooperate with researchers, ecologists, geneticists and other interested parties to develop seed zones or breeding zones for native plants (Chapter III, revised Forest plans). Land managers will be encouraged to collect seeds of native plants to be used in rehabilitation and restoration activities. Seeds will be collected in accordance with seed zones or breeding zones. Additionally, work to develop long-term storage facilities for collected seeds such as the seed bank at the Lucky Peak Nursery will be conducted (Chapter III, revised Forest plans). When available and not cost-prohibitive, seeds and plants used for seedings and plantings in revegetation projects should originate from genetically local sources of native species. When project objectives justify the use of non-native plant materials, documentation explaining why non-natives are preferred should be part of the project planning process (Chapter III, revised Forest plans).

<u>*Education*</u> – Native and rare plant conservation efforts can be greatly benefited through education programs and outreach efforts. Efforts to enhance public awareness of the fundamental importance of plants to society through educational programs about native plants, plant conservation, biological diversity, ecological processes, and noxious weeds will be made (Chapter III, revised Forest plans). Forests will also attempt to enhance public awareness of the fundamental importance of plants to society through educational programs about native plants, plant conservation, biological diversity, ecological processes, and noxious weeds (Chapter III, revised Forest plan).

<u>General Effects</u>

Threats to TEPCS plants were identified previously in this section. These threats are assessed below for their direct and indirect effects to plant populations and habitats. Impacts were grouped into five management actions that have the most potential to affect plants: (1) fire (wildfire and fire use), (2) livestock grazing activities, (3) recreational activities, (4) mechanical activities, and (5) noxious weed invasion. The intensity and spatial extent of the management actions would vary by alternative; however, the general impacts to plants associated with each of the management actions are described below.

Fire (Wildland Fire and Fire Use) - All of the alternatives would use fire as a tool to accomplish management goals and objectives. Each alternative has different management emphasis areas and as such the use and emphasis of fire will vary by alternative. For example, alternative 5 has more of a commodity emphasis than other alternatives. Fire will not be a major vegetation management tool due to the desire to provide forest products. Many areas will require mechanical preparation of fuels before fire can be re-introduced as a management tool. As the potential for spring burning increases to meet fire use goals, the potential impacts to many plants increase. Most plants are not adapted to fire at this time of year. Spring burning interferes with flowering, fruiting, and other physiological impacts, and could affect life history patterns with pollinators. However, these risks need to be weighed against the risks of uncharacteristic wildfire and long-term habitat loss of plant species. Several of the TEPCS plants thrive in the openings created by fires (Appendix G, Table G-4); therefore, fire use to restore the historic fire regime would benefit these species in the long term.

Wildfires can pose risks to some of the TEPCS plants, particularly when the fires are uncharacteristic. As an example, an entire population of *Saxifraga bryophora var. tobiasiae* was recently lost due to uncharacteristic wildfire. In general, most plant species would benefit by the restoration of more historical fire regimes. There are also direct and indirect impacts to plants associated with wildfire suppression activities, such as fire line construction and other mechanical activities, salvage logging, reforestation following fire, and the increased potential for the spread of noxious weeds.

Livestock Grazing Activities - Various direct and indirect impacts are associated with livestock grazing. Direct impacts include livestock trampling, herbivory, congregation and associated soil disturbances, and ORV use by range riders. Indirect impacts are more varied. These include the increased potential for the spread of noxious weeds and associated herbicide spraying, the introduction of exotic species, and changes in species composition and density of grasslands, shrublands, and woodland environments. These changes often affect the habitat available for

TEPCS species. Livestock often utilize and congregate in riparian areas and meadows, which can also alter species composition and change the habitat available to TEPCS species. Additionally, changes in vegetation and bank stability can affect hydrological cycles, further stressing plants that depend on stable hydrological conditions. On the other hand, plants in the Intermountain West have evolved with herbivory by insects, rodents, and wildlife species (elk, deer, big horn sheep and possibly antelope), thus some plants may benefit from grazing at appropriate intensity levels (Burkhardt 1995).

Recreational Activities - The most important direct impact related to recreation is trampling, both by hikers and ORV use (Liddle 1975, 1991). These types of activities particularly threaten many TEPCS species. Road building and the development of campgrounds and other facilities used by recreationists also contribute to plant impacts, as these developments make more areas accessible and concentrate use. Dispersed camping and recreation have similar impacts, which are more difficult to monitor. Parking areas, particularly undesignated areas, pose similar impacts to plants. An example of the recreational impacts to plants is illustrated by *Castilleja christii*. After a road bisecting the population was paved, ORV use, dispersed recreation, and user accessibility increased. Plants next to the roadbed were lost. The long-term impacts of bisecting the population to functions such as reproduction and dispersal are still unknown. Other recreational impacts include ORV use, which can also disturb soil, affecting both habitat and potential habitat. Roads and trails for recreational use can contribute to the spread of noxious weeds, and increase the accessibility of areas to native ungulates and livestock, which can increase the impacts of trampling, herbivory, and congregation.

Mechanical Activities - Mechanical activities include vegetation management treatments, whether for restoration or to meet growth and yield objectives. Activities such as logging can have impacts to plants and plant habitat through canopy removal, soil disturbance and erosion, and stream sedimentation. In addition, mechanical activities for vegetation treatment may require road building. Roads increase access to and fragment habitat and provide an avenue for weed invasion. They can be placed on ridgetops, in riparian areas, or through scree slopes, which are important habitats for a number of species. Reconstruction and maintenance of existing roads can directly or indirectly affect plant populations by introducing competitive weeds and altering availability of light, nutrients, and moisture. Sudden changes in seral stage, or an abundance of early seral stages, also reduce the available habitats for those plants that require mid-late seral stages. However, those species that prefer openings, early-seral stages, or some ground disturbance, could benefit from moderate levels of mechanical activities. Changing patch dynamics across the landscape could also have effects to TEPCS plant species. As discussed above in fire, the restoration of historical fire regimes and restoration of conditions towards HRV with a range of seral stages for different potential vegetation groups may benefit some TEPCS species in the long term.

Noxious Weed Invasion - Noxious weeds directly affect plants and plant populations through competitive displacement. Indirect impacts include herbicide spraying and mechanical ground disturbance to control noxious weeds once they gain a foothold. Competition from invasive non-native species and noxious weeds can result in the loss of habitat, loss of pollinators, and decreased TEPCS species viability. Roads, trails, livestock, and canopy reduction can provide ideal pathways for the introduction of exotic and non-native species. Indirectly, herbicide spraying can destroy populations of native pollinators by contaminating nesting materials and pollen resources (Pierson and Tepedino 2000), further decreasing the viability and reproductive success of TEPCS species. Some species of non-native plants will alter hydrological regimes, changing and reducing the habitat available to TEPCS plants.

Evaluation of Risk and Uncertainty

When assessing effects for the entire Ecogroup area, there are limitations in determining the impacts of the complex set of management emphases under each alternative for the 76 current or proposed sensitive species (threatened, proposed, and candidate species were analyzed separately). Causes of rarity can vary greatly for individual species. Species may be intrinsically rare or rare as a result of anthropogenic interference (Kruckeberg and Rabinowitz 1985). Other plant species may be rare due to their population ecology, evolutionary history, or basic reproductive biology. Historical or current anthropogenic activities may also contribute to the current distribution of these rare species. It is assumed in this analysis that certain management actions may promote or detract the potential long-term viability of TEPCS plant species, or may increase or decrease the availability or quality of habitats that support these TEPCS plant species.

Degree of Active Management by MPC - The potential impacts of each management prescription category (MPC) were ranked as low, moderate, or high based on the definitions and objectives for each prescription category (see Chapter 2). The potential impacts to the TEPCS species were ranked for the five management actions (fire, livestock grazing activities, recreational activities, mechanical activities, noxious weed invasion) that have the most potential impacts to plants. These rankings are displayed in Table B-25. The justification for each impact ranking is also included below.

Table B-25. Rating of Potential Impacts on TEPCS Species and Habitats by MPC

MPC	Fire Use	Grazing	Recreation	Mechanical	Noxious Weeds
1.1	High	None to low	Low	None	Low to moderate
1.2	High	Low to moderate	Low	None	Low to moderate
2.0/2.1	Low	Low to moderate	Low to moderate	Low to moderate	Low to moderate
2.2	Low	Low	Low	None	Low to moderate
2.4	Low	None to low	Moderate	Moderate	Moderate
3.1	Low to moderate	None to low	Low to moderate	None to low	Moderate
3.2	Moderate	Low to moderate	Low	Low to moderate	Moderate to high
4.1a	High	Moderate	Low	None to low	Low *
4.1b	High	Moderate	Low	Low	Low to moderate*
4.1c	High	Moderate	Low	Low to moderate	Low to moderate*
4.2	Low to moderate	Low to moderate	Moderate to High	Moderate	High
4.3	Low to moderate	None to low	High	Low to Moderate	Moderate to high
5.1	Moderate	Low to moderate	Low to Moderate	Moderate to high	Moderate to high
5.2	Low	Low to moderate	Moderate	High	Moderate to high
6.1	Moderate	Moderate to high	Moderate to High	Moderate to high	Moderate to high
6.2	Moderate	Moderate to high	Moderate to High	High	Moderate to high
8.0	Low to moderate	Moderate	Moderate	High	Moderate to high

*Low in Alternatives 1B through 5, and 7. None to low in Alternative 6.

Existing Wilderness and Recommended Wilderness, MPCs 1.1 and 1.2 **-** The potential impacts of fire to TEPCS plant species are high. Fire use is the only vegetative management tool allowed in these MPCs. Wildland fire use for resource benefits is currently the primary fire use. Management actions, including wildland fire use and prescribed fire, must be designed and implemented in a manner that maintains wilderness values, as defined in the Wilderness Act (MPC standard). The potential impacts from grazing are none to low in MPC 1.1 and low to moderate in MPC 1.2. These areas generally have lower stocking and use levels where livestock are permitted. The levels of livestock use are controlled primarily by utilization standards, particularly in riparian areas. The potential impacts from recreational activities are relatively low. Trampling effects are high within trail corridors and around popular destinations but the overall impact is low when areas outside of corridors and destination sites are considered. Impacts are also limited by absence of (1.1) or generally low levels of (1.2) motorized vehicle traffic. These areas provide primitive and semi-primitive recreation experiences that are generally lower levels and concentrations of use. There are no potential impacts from mechanical activities because timber harvest, road building, and mining are generally not allowed. Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty (MPC standard). The potential impacts of noxious weed invasion are low to moderate in these MPCs. Dispersal of noxious weed seed is generally limited to along the trail systems and river corridors. Monitoring and detection of infestation is often infrequent in wilderness areas, thus allowing for noxious weeds to establish and expand prior to discovery. Increased uncharacteristic wildfire under these MPC could also create new opportunities for weed establishment.

Wild and Scenic Rivers, MPC 2.1 - This management prescription includes areas that have been Congressionally designated as Wild, Scenic, or Recreational rivers and their associated land corridors, which extend an average of 0.25 mile from each bank. These designations are made to protect free-flowing waters and "outstanding remarkable values". These areas will be administered under a management plan that will provide standards and guidelines designed to help protect and promote the continued viability of TEPCS species. All potential impacts are low to moderate as a result, except low impacts from fire use. In scenic or recreational corridors, mechanical treatments may be used as long as Outstanding Remarkable Values (ORVs) are maintained within the river corridor. Noxious weeds may be slightly higher along river courses as a result of heavier recreational activity. Prescribed fire and wildland fire may be used in any river corridor as long as the ORVs are maintained (MPC guideline).

Research Natural Areas, MPC 2.2 – This prescription applies to areas that have been administratively established as Research Natural Areas (RNAs). Management emphasis in RNAs is to protect and preserve their intrinsic qualities, and vegetation manipulation is only allowed where activities perpetuate the protected ecosystems. The potential impacts of fire on TEPCS species and their habitats are low. Suppression efforts are generally used to protect RNAs, and management plans generally do not include fire use. Prescribed fire and wildland fire may only be used to maintain vegetative values for which the areas were established or to achieve objectives consistent with the RNA establishment record or management plan (MPC standard). The potential impacts of grazing on TEPCS plant species and their associated habitats are low. Impacts from grazing are incidental because grazing is discouraged within MPC 2.2 and measures to prevent incidental livestock use within these areas are employed where needed.

The overall potential impacts of recreational activities are low within RNAs. Most RNAs have low use, motorized recreation is typically restricted, and recreation is generally limited to trails. Mechanical activities pose little to no threat, as timber harvest and salvage harvest may only be used to maintain vegetative values for which areas were established or to achieve objectives consistent with the RNA establishment record or management plan (MPC standard). Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty, or to maintain the values for which the RNA was established (MPC standard). Potential impacts from noxious weeds are low to moderate within RNAs. There is little to no management disturbance and the potential for exotic seed dispersal from roads or trails within these areas is low.

Boise Basin Experimental Forest, 2.3 **-** This area (8,740 acres) has been established to provide for vegetation management research of ponderosa pine (*Pinus ponderosa*). This area is designated for research purposes, and activities are designed and implemented to meet research objectives. Potential impacts of fire to TEPCS plant species and their habitat are low in this MPC. Wildland fire use is prohibited (MPC standard), and prescribed fire may occur as part of planned research, provided that research objectives are not compromised (MPC guideline). Grazing poses little to no threat to TEPCS plant species because livestock grazing is prohibited unless prescribed as a management tool to achieve research objectives (MPC standard). Recreational activities pose a moderate threat to TEPCS plants species and habitat. An extensive road network has been built within the forest to accomplish the research objectives. Popular trails within the area are highly used by motorcyclists and other off-road vehicle users. The potential impacts of mechanical activities are moderate within this MPC as well. Mechanical treatments of vegetation may occur as part of planned research activities or to achieve other objectives, provided that research objectives are not compromised (MPC guideline). Salvage harvest may occur as part of planned research activities (MPC guideline). Noxious weeds pose a moderate level of potential impacts within this area. The large system of roads and trails and the high use of the area increase the potential threat of invasion of noxious weeds and exotic species.

Passive Restoration and Maintenance of Aquatic, Terrestrial, and Hydrologic Resources, MPC 3.1 **-** Management intent is to minimize temporary risks and to avoid short- and long-term risks from management actions to soil/hydrologic conditions and aquatic, botanical, and terrestrial habitats. The potential impacts from fire to TEPCS plant species are low to moderate. Wildland fire and prescribed fire may only be used where they maintain or restore water quality needed for fish species or where they maintain or restore habitat for native and desired non-native wildlife and plant species (MPC standard). The primary emphasis of fire use will likely be prescribed fire to control fuel and density levels. These types of projects will require site-specific surveys and mitigation when necessary. Livestock grazing poses low to no potential impacts to TEPCS species and their habitat. This MPC emphasizes low stocking and use levels where livestock are permitted. The level of use is controlled by utilization standards, particularly in riparian areas. The potential impacts of recreational activities to TEPCS plants and habitat are low to moderate. The potential impacts of mechanical treatments are none to low. Mechanical vegetative treatments, excluding salvage harvest, may only occur where wildland fire use or prescribed fire would result in unreasonable risk to public safety and structures, investments, or undesirable resource affects; and they maintain or restore water quality needed to fully support beneficial uses and habitat for native and desired non-native fish species; or they maintain or restore habitat for native and desired non-native wildlife and plant species (MPC standard). Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty, or to address immediate response situations, where if the action is not taken, unacceptable impacts to hydrologic, aquatic, riparian, or terrestrial resources, or health and safety, would occur (MPC standard). The potential impacts of noxious weeds to TEPCS species and habitats are moderate. The frequency of prescribed fire and wildland fire that is lethal will likely enhance conditions for noxious weed establishment. The amount of monitoring and detection may decrease, thus allowing for increases in establishment. This may be balanced, however, by the decrease in road densities, thus reducing the risk of new establishment.

Active Restoration and Maintenance of Aquatic, Terrestrial, and Hydrologic Resources, MPC 3.2 – The management intent is to minimize temporary and short-term risks and to avoid long-term risks from management actions to soil/hydrologic conditions and aquatic, botanical, and terrestrial habitats. The management emphasis is to actively restore or maintain aquatic, terrestrial, and hydrologic conditions through a combination of natural processes and management activities (noxious weed treatment, thinning, prescribed fire, watershed restoration, and wildland fire for resource benefit). The potential impacts from fire are moderate. A mix of fire use and mechanical treatment can be used to reduce long-term risks and ensure sustainability of habitat and aquatic/riparian objectives. Site-specific analysis for fire use and prescribed fire will allow for the incorporation of mitigation and will help reduce the impacts of fire to TEPSC species. Livestock grazing poses low to moderate potential impacts to TEPCS species and their habitats. Grazing practices, stocking, management systems, durations, timing, and use levels are adjusted or planned with the intent to meet specific management area objectives and standards for wildlife, aquatic, and vegetative resources. The potential impacts of recreational activities to TEPCS plants and habitat are low. There are moderate to high levels of control for travel and dispersed recreation. The potential impacts of mechanical treatments to TEPCS plants species are low to moderate due to restoration activities that may occur in localized areas. The potential impacts of noxious weeds to TEPCS species and habitats are moderate to high. Vegetation is managed through a mix of fire and mechanical treatment to control stand density levels. Soil disturbance may occur with active restoration activities. The extent of treatment in the short term may depend upon the desired objectives.

Undeveloped Recreation: Maintain Inventoried Roadless Areas, MPC 4.1a **–** This prescription applies to lands where dispersed and undeveloped recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an inventoried roadless area is the primary objective. The potential impacts of fire to TEPCS plants and habitats are high. Fire use is the primary vegetation management tool, although the opportunity or the ability to utilize fire as a management tool may be low. The potential impacts from grazing to TEPCS plant species are moderate. These areas generally have low stocking and use levels where livestock are permitted. Recreational activities pose low potential impacts. The trampling effects are higher along trails and in popular destinations, but the overall impacts of recreation are low when compared with the amount of area assigned to this MPC. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise recreation resource values. The potential impacts of mechanical activities are none to low. Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty (MPC standard). Mechanical treatments are limited. The potential impacts of noxious weeds on TEPCS plants and habitats are none to low. Motorized travel is allowed in some areas, thus increasing the potential for invasion. Dispersal of exotic seed, however, is generally limited to trails and river corridors. Monitoring and detection may be less frequent; therefore the potential for infestation or establishment is increased. Species habitat and recreational uses are generally compatible, although recreation uses may be adjusted to protect listed, proposed, or sensitive species.

Undeveloped Recreation: Maintain Undeveloped Character with Allowance for Salvage Harvest, MPC 4.1b **-** This prescription applies to lands where dispersed recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an undeveloped landscape is the predominant objective. The potential impacts of fire to TEPCS plants and habitats are high. Fire use is the primary vegetation management tool, although the opportunity or the ability to utilize fire as a management tool may be low. The potential impacts from grazing to TEPCS plant species are moderate. These areas generally have low stocking and use levels where livestock are permitted. Recreational activities pose low potential impacts. The trampling effects are higher along trails and in popular destinations, but the overall impacts of recreation are low when compared with the amount of area assigned to this MPC. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise recreation resource values. The potential impacts of mechanical activities are low. Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty (MPC standard). Management actions allowed in MPC 4.1b—including salvage harvest, wildland fire use, prescribed fire, and special-use authorizations—must be designed and implemented in a manner that does not adversely compromise the area's undeveloped character in the temporary, short term, and long term (MPC standard). The potential impacts of noxious weeds on TEPCS plants and habitats are low to moderate. Motorized travel and salvage harvest area allowed in some areas, thus increasing the potential for invasion. Dispersal of exotic seed, however, is generally limited to trails and river corridors. Monitoring and detection may be less frequent; therefore the potential for infestation or establishment is increased. .

Undeveloped Recreation: Maintain Unroaded Character with Allowance for Restoration Activities, MPC 4.1c **-** This prescription applies to lands where dispersed recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an unroaded landscape is the predominant objective. The potential impacts of fire to TEPCS plants and habitats are high. Fire use is the primary vegetation management tool, although the opportunity or the ability to utilize fire as a management tool may be low. The potential impacts from grazing to TEPCS plant species are moderate. These areas generally have low stocking and use levels where livestock are permitted. Recreational activities pose low potential impacts. The trampling effects are higher along trails and in popular destinations, but the overall impacts of recreation are low when compared with the amount of area assigned to this MPC. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise recreation resource values. The potential impacts of mechanical activities are low to moderate. Management actions allowed in MPC 4.1c—including mechanical vegetation treatments, salvage harvest, wildland fire use, prescribed fire, special use authorizations, and road maintenance—must be designed and implemented in a manner that would be consistent with the identified Management Area Recreation Opportunity Spectrum (ROS) objectives in the temporary, short term, and long term (MPC standard). Within IRAs, road construction and reconstruction may only occur where needed to provide access related to reserved or outstanding rights, or to respond to statute or treaty (MPC standard). Outside IRAs, road construction and reconstruction may only occur where needed: to provide access related to reserved or outstanding rights, or to respond to statute or treaty, or to provide transportation systems that support accomplishment of Management Area Recreation Resource Opportunity Spectrum objectives (MPC standards). The potential impacts of noxious weeds on TEPCS plants and habitats are low to moderate. Motorized travel, mechanical vegetation treatments, fire use, and salvage harvest area allowed in some areas, thus increasing the potential for invasion. Dispersal of exotic seed, however, is generally limited to trails and river corridors. Monitoring and detection may be more frequent in restoration project and therefore the potential for infestation or establishment is decreased.

Roaded Recreation Emphasis, MPC 4.2 **-** This MPC promotes a predominately natural-appearing environment and an emphasis on recreation resources. A wide range of recreational activities and developments occurs. Potential fire impacts to TEPCS plant species and habitats are moderate to low. These areas have a suited timber base with greater emphasis on mechanical treatment, though prescribed fire may be used to meet vegetation management objectives, to restore fire as a process, and to reduce the risk of uncharacteristic vegetation due to insects, diseases, and fire on recreation settings and development. Vegetation management actions, including wildland fire use, prescribed fire and mechanical treatments, may be used to maintain or restore desired vegetation and fuel conditions provided they do not prevent achievement of recreation resource objectives (MPC guideline). The potential impacts of livestock grazing are low to moderate. Livestock stocking in forested areas will be lower in order to provide flexibility to meet specific management area objectives. Grazing is allowed to the extent that it does not compromise recreation resource values. Recreational activities pose moderate to high potential impacts. Human use and presence are generally obvious. Concentrated and fairly high levels of recreation use occur in road corridors and around developed recreation sites. A more extensive road system (both classified and user-created) is likely in MPC 4.2 than in MPC 4.1, thus creating greater accessibility and increasing potential impacts to plant species. Mechanical activities pose moderate impacts to TEPCS plants and their habitats. Suited acres for timber harvest exist but vegetation management is used to meet recreation objectives. The potential impacts of noxious weeds are high. The risk of spread is high due to the extent of motorized use, range of uses, the management activities allowed, and the likelihood of low to moderate levels of detection and monitoring.

Concentrated Recreation, MPC 4.3 **–** This prescription applies to lands where developed recreation uses are the primary emphasis. These areas are typically characterized by substantial recreation-related infrastructure and capital investment. The potential impacts of fire to TEPCS plants and their habitats are low to moderate due to the urban interface and high social-economic values of these areas that will limit the amount of fire used as a vegetation management tool. Vegetation management actions, including prescribed fire and mechanical treatments, may be used to manage fuel conditions and support recreation resource objectives (MPC guideline). Livestock grazing poses little to no potential impacts, as grazing is extremely limited in this MPC. Grazing is allowed to the extent that it does not compromise recreation resource values.

Potential impacts of recreational activities are high. These areas are highly roaded and developed. Human use and presence are obvious and the area may have a substantially modified natural environment. Facilities are maintained, and both motorized and non-motorized recreation may be provided. Concentrated and very high levels of recreation use occur in road corridors and around developed recreation sites. Mechanical activities pose low to moderate impacts to the TEPCS plant species. Vegetation management is likely limited due to social constraints. The potential impacts from noxious weeds are moderate to high. Soil disturbance is relatively high in this MPC. Monitoring and detection are high within this MPC and financial sources for rehabilitation and treatment are high.

Restoration and Maintenance Within Forested Landscapes, MPC 5.1 **–** This prescription applies to predominantly forested lands where management activities are designed to restore or maintain vegetation and other biophysical conditions. Management emphasis is on maintaining and restoring forest ecosystem integrity, improving long-term resilience of resources to disturbance events, and attaining sustainable resource conditions in forested landscapes. Potential impacts of fire to TEPCS plant species and habitat are moderate. There is a greater emphasis on restoring vegetation and returning fire as a process in this MPC than in other MPCs. Livestock grazing poses low to moderate potential impacts. Livestock stocking in forested areas will be lower in order to provide flexibility to meet specific management area objectives. Potential impacts of recreational activities are low to moderate. There are available road networks within this MPC, although obstacles, including terrain and vegetation, limit the range of ORV use and associated recreational impacts. Mechanical activities pose moderate to high potential impacts. On suited acres, vegetation management is used to meet biodiversity and restoration objectives. Commodity production is allowed, but achievement of high timber growth and yield is not the primary purpose. There is less road construction and reconstruction than in MPC 5.2 (see MPC 5.1 guidelines). In this MPC, there would be a relatively high level of mechanical disturbance compared to most other MPCs, however, the intent of the MPC is to restore or maintain vegetative diversity. Thus, the long-term benefits of this restoration or maintenance may outweigh the short-term impacts within rare plant habitat. As such, the long-term effects may be moderate but short-term risks would still be moderate to high. The potential impacts of noxious weeds are moderate to high. Soil disturbance associated with mechanical activities (i.e., ground disturbance associated with vegetation management or fire use) could increase the risk of invasion. Travel management may be controlled with seasonal or yearlong road closures, thus reducing the risk of spread.

Commodity Production within Forested Landscapes, MPC 5.2 **-** The management emphases are on sustainable resource conditions while maintaining and restoring forest ecosystem health to reduce the potential for long-term degrading effects from uncharacteristic disturbance events. Potential impacts of fire are low. There is a greater emphasis on mechanical treatment of vegetation, and fire use will be limited to activity fuels treatment (See MPC guidelines). Wildand fire use is prohibited (MPC standard). Livestock grazing poses low to moderate potential impacts. Livestock stocking may be slightly lower in order to provide flexibility to meet forest productivity objectives. Potential impacts of recreational activities to TEPCS species are moderate. There are available road networks within this MPC, but with higher road densities allowing more widespread recreation access. However, there are more obstacles to cross-country vehicle travel, including terrain and vegetation, compared to 6.1 and 6.2. Mechanical activities pose high potential impacts. In suited acres, vegetation management is used to meet growth and yield objectives. This MPC has the highest potential for road construction and greatest potential for emphasis on mechanical, ground-disturbing equipment in forested environments. The potential impacts of noxious weeds to TEPCS plant species and habitat are moderate to high. Soil disturbance is moderate to high due to the level and frequency of mechanized activities, and motorized use and road density may be high. The level of monitoring and detection activity will be high, as will the ability to prevent, contain, control, and eradicate new infestations. Funding for such efforts will be higher due to contract and permit clauses.

Restoration and Maintenance Within Shrubland and Grassland Landscapes, MPC 6.1 **-** This prescription applies to landscapes that are predominantly (>50 percent) shrubland and grassland. Management activities are designed to maintain or restore desired vegetation conditions, improve long-term resilience of resources to disturbance events, and achieve sustainable resource conditions in non-forested landscapes. Potential impacts of fire are moderate. Emphasis is on restoring vegetation and returning fire as a process in this MPC. Livestock grazing poses moderate to high potential impacts. Shrublands provide a more balanced level of age class and density that results in a balanced mixture of seral conditions. Pasture use durations may be longer in some situations. Trampling, along with flower and seed development disruption, may occur in early season pastures. The potential impacts of recreational activities are moderate to high. Available road networks, gentle terrain, and the lack of vegetation obstacles may allow for increased impacts from ORVs. Mechanical activities pose moderate to high potential impacts. As in MPC 5.1, MPC 6.1 would have a relatively high level of mechanical disturbance compared to most other MPCs, however, the intent of the MPC is to restore or maintain vegetative diversity. Thus, the long-term benefits of this restoration or maintenance may outweigh the short-term impacts within rare plant habitat. As such, the long-term effects may be moderate but short-term risks would still be moderate to high. In suited acres, vegetation management is used to meet biodiversity and restoration objectives. However, there is less road construction and reconstruction than in MPC 6.2. The potential impacts of noxious weeds are moderate to high. Soil disturbance associated with restoration and recreational activities could increase the risk of invasion.

Commodity Production within Shrubland and Grassland Landscapes, MPC 6.2 **-** This prescription applies to landscapes that are predominantly (>50 percent) shrubland and grassland. Management emphasis is on achieving sustainable resource conditions for commodity and non-commodity outputs while maintaining and restoring ecosystem health to reduce potential for long-term effects from uncharacteristic disturbance events. Management emphasis is on providing suitable grazing lands for forage production of livestock. The potential impacts of fire to TEPCS plant species and habitat are generally moderate, although they tend to be higher in forested vegetation than non-forested vegetation. Prescribed fire is used more frequently to sustain shrublands in early to mid seral conditions (See MPC standards). Wildland fire levels are moderate due to suppression. Livestock grazing poses moderate to high potential impacts to TEPCS plant species and habitat. A majority of the shrublands will be maintained in early seral and mid seral conditions through prescribed fire and livestock management. Trampling, along with flower and seed development disruption, may occur in early season pastures. The potential impacts of recreational activities are moderate to high. Available road networks, gentle terrain, and the lack of vegetation obstacles allow for increased impacts of ORVs. Mechanical activities pose high potential impacts. Vegetation management is used to meet forage production for livestock. As a result, this MPC has a high potential for road construction and for emphasis on mechanical, ground-disturbing equipment in non-forested environments. The potential impacts of noxious weeds to are moderate to high. Soil disturbance associated with restoration activities could increase the risk of invasion. Additionally, fire use levels may create more opportunities for spread.

<u>*Concentrated Development Areas, MPC 8.0*</u> **-** This prescription includes lands managed for concentrated development and use. Uses and facilities dominate the landscape and often require extensive site alterations. Management activities may include mining, limited timber harvest, road building, limited motorized recreation, and limited fire use and suppression. Wildland fire is prohibited (MPC standard).

Amount of MPC by Alternative - The relative amount of each MPC by alternative was calculated from the proportion of acres assigned to an MPC divided by the total acres within the Ecogroup (See Chapter 2 for individual acreage by MPC). These data are displayed in Table B-26 below.

Table B-26. Percent of MPC by Alternative for the Ecogroup

MPC	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1.1	14.9	14.9	14.9	14.9	14.9	14.9	14.9
1.2	10.0	10.0	10.0	38.4	0.0	10.0	10.0
2.0/2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3.1	0.0	1.4	3.0	10.2	0.0	0.5	9.8
3.2	Trace	10.9	20.2	16.7	1.3	3.5	12.8
4.1a	Trace	0.1	0.3	1.0	3.3	38.9	1.3
4.1B	18.1	16.7	0.0	0.0	0.0	13.8	0.0
4.1c	0.8	4.4	8.7	5.6	8.5	0.7	17.9
4.2	10.6	4.9	5.3	2.2	8.2	1.5	3.2
4.3	Trace	Trace	Trace	Trace	Trace	Trace	Trace
5.1	13.5	19.4	25.2	4.7	17.6	8.9	11.7
5.2	19.7	5.6	0.0	0.0	31.2	3.6	9.8
6.1	0.3	7.6	10.0	5.8	3.5	1.9	8.0
6.2	10.9	3.6	1.7	0.0	10.6	1.3	0.0
8.0	0.5	0.0	0.0	0.0	0.4	0.0	0.0

<u>Assumptions and Limitations</u>

As with most broad-scale analyses, there are inherent limitations and assumptions that must be considered. These limitations and assumptions are often unavoidable given the large scale of the analysis area, the large number of species included, and the fine scale nature of rare plant species analysis. Despite the limitations and assumptions detailed below, we believe that this analysis is the most detailed and meaningful analysis we could complete given the nature of the programmatic scale of the proposed action.

Limitations of Using Habitat Groups - The habitat group methodology employed in this effects analysis may overlook key features of plant habitat and ecology. Ecological interrelationships such as pollinators and their viability requirements, or mycorrhizal associations, are often important features that are necessary for the continued survival and viability of TEPCS plant species. Such factors may not be accounted for by using broad habitat categories to classify TEPCS plant species. In natural ecological systems, the factors that contribute to the physiognomy and distribution of species often occur as a continuum, not as discrete categories named habitat groups. Soil moisture, soil type, microsite moisture conditions, canopy closure, temperature, and light conditions often occur along a gradient. Individuals or populations of TEPCS plant species occur along this gradient in a wide range of conditions. The use of habitat groupings is an attempt to begin capturing this variation of ranges and to bring like species together. The scale we are using to bring together these associations cannot possibly capture all of the environmental characteristics and intrinsic features necessary for the successful establishment and continued viability of TEPCS plant species.

Limitations of Using Population Trend Categories - The estimation of trend is often a qualitative judgment made by Forest Service botanists and ecologists and researchers for a given TEPCS plant species. For many of the TEPCS species in the Ecogroup, the population trend is currently unknown because most surveys and monitoring have been limited to those populations where projects are proposed (Table B-21). Additionally, for a large majority of the TEPCS species within the Ecogroup, little demographic or biological information is known. Long-term demographic monitoring and research has only been conducted for a small portion of the TEPCS plant species found within the Ecogroup.

Limitations of Using MPCs for Broad-scale Analysis - In this analysis, potential adverse effects to botanical resources from recreation, mechanical, grazing, and fire activities are linked to the Management Prescription Categories that are assigned across the three Forests. Indirectly, the susceptibility of noxious weeds and non-native plant establishment are also tied to the MPCs assigned to each area. This linkage may be generally acceptable for a broad-scale assessment but would not be appropriate for fine-scale analysis.

The linkage between MPC assignment and recreation effects is limited for the following reasons:

- The ability to characterize impacts is much easier and accurate with some MPCs than others. For example, it's obvious that areas assigned to 4.3 are likely to be heavily affected by recreation activities since these areas are highly concentrated, high recreation use zones and would be somewhat homogenous. In contrast, areas assigned to 5.1 are much more varied in terms of recreation uses, concentrations, use levels, locations across the landscape, etc.

- Recreation uses and activities do not occur as a result of MPC assignment. Management of recreation activities is likely to be influenced by the MPC assignment but management is probably more influenced by many other local factors, which cannot be fully assimilated in a programmatic analysis. Recreation activities occur for the most part where there are attractive features in the landscape—such as lakes, streams, or scenic settings—as well as where facilities have been constructed that provide for recreation opportunities, such as campgrounds, trails, roads, boat ramps, etc. These attractive features and facilities tend to be fixed in location whereas MPC assignment varies by alternative. Potential impacts from recreation to botanical resources in a highly used recreation corridor, such as along State Highway 21, would not be likely to vary much purely as a result of MPC assignment.

- Linkage to MPCs does not incorporate existing recreation controls where they currently exist or the lack of controls. Important factors, such as travel management regulations, can only be included broadly by assumption and don't reflect actual areas on the three Forests.

Limitations of Extrapolating Effects Analysis for TEPCS Species to the Ecogroup Flora - The habitat group concept is based upon the habitat requirements of the 79 current or proposed sensitive or watch species identified within the Ecogroup. The habitat distribution of these rare plant species are not representative of the entire flora of southwestern Idaho, and should not be treated as such. Many of the 86 TEPCS species have rather unique habitat requirements, such as edaphic characteristics, microsite limitations, or ecological associations. Many species may be intrinsically rare, newly evolved, or may be relicts. An additional limitation of this analysis is based on the limited spatial data for potential habitat of TEPCS plant species. Only those species with known element occurrences within the Ecogroup were included in the analysis. Spatial data of potential habitat for most TEPCS species is not currently available. An analysis of the entire Ecogroup flora has not been designed or attempted at this time.

Assumptions of Implementation of Standards, Guidelines, and Forest Service Directives - The viability of the 86 TEPCS plant species and their respective habitats will be promoted with implementation of standards and guidelines, inventory and monitoring, and adherence to Forest Service directives for threatened, endangered, proposed, and sensitive plant species. Consistent implementation of standards and guidelines and adherence to Forest Service Management Policy across the Ecogroup for all alternatives is mandatory for TEPCS plant species conservation.

<u>Measures and Factors to Assess Effects on TEPCS Species</u>

The current and potential threats to each individual threatened, endangered, or proposed (including candidate) species were determined from current scientific literature and professional botanical knowledge and expertise (summarized in Appendix G Tables G-3, G-4, and G-5; and above, under Current Conditions). Using GIS technology, a map with an overlay of MPCs and the most current distribution information for element occurrences of TEPSC plant species (ICDC 2002) was created for each alternative. The ratings of potential impacts (Table B-25) for TEPC species and habitats by MPC were then used to determine the overall effects of the MPCs for each individual TEPC species by alternative. For those species with only potential habitat within the Ecogroup, the MPCs that would most likely impact the habitat were compared by alternative. Specific project areas and models were generated for TEPC species and are summarized by species below.

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's four-o'clock) -** Potential habitat for *Mirabilis macfarlanei* may exist on the Payette National Forest in the Hells Canyon Management area. To examine the potential effects to potential habitat, the Hells Canyon Management Area was selected as the project area. The MPCs assigned to the Hells Canyon Management Area by alternative were examined for potential impacts to potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 3.2, 4.1a, 4.1b, 4.1c, and 6.1. The five potential impacts and their potential magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Because noxious-weeds and exotic plant invasion, fire use and suppression, livestock trampling, ORV use, and road construction have been documented as major threats for *M. macfarlanei* populations, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with less potential impacts.

***Spiranthes diluvialis* (Ute ladies'-tresses orchid) -** To address the potential impact to *S. diluvialis* potential habitat by alternative, the riparian habitat group created from CICP data (Redmond et al. 1998), Idaho classification data (Homer 1998a) and Utah classification data (Homer 1998b) was used a surrogate to determine potential habitat within the Ecogroup (see Affected Environment for covertypes used to create this habitat group). Riparian habitat above 7000 feet was included; thus the impacts to potential habitat for *S. diluvialis* may be over-estimated.

RCAs have been determined for the Ecogroup. Within the RCAs, certain standards and guidelines have been developed to prevent degradation within riparian areas. The management objectives, standards, and guides for RCAs are similar across all alternatives except alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan direction but does address restoration impacts as directly as other alternatives.

The MPCs assigned to the modeled potential habitat for *Spiranthes diluvialis* by alternative were examined for potential impacts to the potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 3.1, 3.2, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Noxious-weeds and livestock trampling have been documented as major threats for *S. diluvialis* populations thus the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

***Silene spaldingii* (Spalding's Catchfly) -** The Payette National forest has developed a model to predict potential habitat for Spalding's catchfly. The following criteria were used to define the potential habitat for *Silene spaldingii*: (1) elevation from 0-5100 feet, (2) canopy coverages of <40 percent for shrubs, Douglas fir, and Ponderosa pine types, (3) land cover types (upland grassland, altered grasslands, mesic montane parklands and subalpine meadows, mesic shrublands, Ponderosa pine, Douglas-fir/Ponderosa Pine) (LANDSAT data Redmond et al. 1998), and (4) Bailey's Ecoregions (Palouse prairie section, Blue Mountain section, Idaho batholith section). Using this model, a total of 2740 acres of potential habitat was predicted for the Payette and Boise National Forests.

The MPCs assigned to the modeled potential habitat for *Silene spaldinigii* by alternative were examined for potential impacts to the potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 3.2, 5.1, 5.2, and 6.1. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Because livestock grazing, fire suppression, roads (construction, reconstruction, and maintenance), non-native plant invasion, fire use and suppression, and ORV use have been documented as major threats for *S. spaldingii* populations, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

***Howellia aquatilis* (Water Howellia) -** As with *Spiranthes diluvialis,* the riparian habitat group created from CICP data (Redmond et al. 1998), Idaho classification data (Homer 1998a) and Utah classification data (Homer 1998b) was used a surrogate to determine potential habitat within the Ecogroup (see Affected Environment for covertypes used to create this habitat group). Because known *Howellia aquatilis* populations have not been located above 5000 feet, the riparian habitat group used to estimate potential effects by alternative overestimates the amount of potential habitat and the likelihood of potential impacts.

The MPCs assigned to the modeled potential habitat for *Howellia aqualitis* by alternative were examined for potential impacts to the potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this rare species are 3.1, 3.2, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Mechanical activities (siltation and hydrologic regime alteration associated with vegetation management), livestock grazing (trampling and soil compaction), non-native plant and noxious weed invasion, road construction and maintenance and fire effects have been documented as major threats for *H. aqualitis* populations. Those MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

Proposed Endangered

***Lepidium papilliferum* (Slick Spot Peppergrass) -** No occupied habitat for this species has been located on National Forest System lands, but potential habitat may exist on the Mountain Home Ranger District, Boise National Forest. To estimate the potential effects to *L. papilliferum* potential habitat by alternative, three management areas (Arrowrock, Boise Front/Bogus Basin, and Lower South Fork Boise River) were examined for MPC assignment below 5300 feet. Using this method, an estimated 205,891 acres of potential habitat of *L. papilliferum* were identified on the Boise National Forest.

The MPCs assigned to the potential habitat for *Lepidium papilliferum* by alternative were examined for potential impacts. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Because fire effects, invasion of exotic plant species, livestock grazing (trampling and uprooting plants), and ORV use have been documented as major threats for *L. papilliferum* populations, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush) -** The population boundary for the only known population of C*astilleja christii* was digitized using GIS technology (see Botanical Resources Technical report for map). The MPCs assigned to the population boundary by alternative were examined for their potential effects. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 4.2, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Recreational uses and activities, ORV use, livestock use (unauthorized), and non-native plant invasion have been documented as major threats for the only known *Castilleja christii* population. Thus, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

***Botrychium lineare* (Slender Moonwort) -** In 2002, the estimated population boundary of the *Botrychium lineare* population on Railroad Ridge was mapped using a handheld GPS unit and digitized into a GIS layer. The MPCs assigned to the population by alternative were examined. Given the relatively small area occupied by *B. lineare*, only one MPC per alternative was assigned. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Few threats have been documented in the population of slender moonwort located on the Sawtooth National Forest, however ORV use, road construction, maintenance, use, and decommissioning, fire suppression, livestock grazing (primarily trampling and soil compaction), and non-native plant invasion have been documented for other populations. Thus, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

The population of *Botrychium lineare* located on the SNRA is atypical given the habitat descriptions from other known sites. In other areas, the habitat for the slender moonwort has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. Populations range in elevation from sea level in Quebec to nearly 3,000 m (9,840 ft) in Boulder County, Colorado. The potential habitat for this Candidate species is therefore difficult to estimate and analyze. It is believed that potential habitat exists within the three Forests and that it may be much different from the isolated population found on the SNRA. As such, a surrogate to represent the potential habitat (occupied habitat presented above) the forestland, grassland, and alpine habitat groups (using satellite classification data) were used estimate effects to the potential habitat for *B. lineare.* The measures used to evaluate the habitat groups are described below.

Measures Used to Evaluate Effects on Habitat Groups - To examine the potential effects to the sensitive species, habitat groupings or habitat associations were determined for the 86 TEPSC plant species. The threats common to each habitat group were then determined from current literature and professional botanical knowledge (summarized in Appendix G, Tables G-3, G-4, and G-5). The acres of habitat groups were calculated using Central Idaho Classification Project (CICP) data (Redmond et al. 1998), Idaho classification data (Homer 1998a), and Utah classification data (Homer 1998b). The percentages of each MPC assigned to the habitat groups were compared by alternative. Those MPCs with the greatest potential impact were determined for each habitat grouping as well, by comparing known population occurrences within MPC distribution. Dominant threats that may be affected or increased for the TEPSC species by MPC and the magnitude of their potential impact (Table B-25) were compared for each habitat group by alternative. The MPCs that had moderate to high potential impacts for the dominant threats and corresponding indicators were considered riskier than those with more conservative potential impacts.

Measures for the Alpine Habitat Group **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the alpine habitat group or its TEPCS populations are 1.2, 4.1c, 4.2, and 5.1. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads, recreation, ORV use, and non-native plants appear to be the dominant threats (Table B-5) to the alpine habitat group. Because these current threats may be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with lower potential impacts.

Measures for the Subalpine Habitat Group **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the subalpine habitat group or its TEPCS populations are 4.1a, 4.1b, 4.1c, 4.2, and 5.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads, recreational uses, fire (inclusion and exclusion), ORV use, and non-native plants appear to be the dominant threats (Table B-6) to the subalpine habitat group. Because these dominant threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Forest Habitat Group **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the forest habitat group or its TEPCS populations are 3.2, 4.1a, 4.1b, 4.1c, 5.1, and 5.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Fire (inclusion and exclusion), timber harvest, roads (construction, reconstruction, and maintenance), activities associated with fire suppression, ORV use, and grazing-trampling by livestock appear to be the dominant threats (Tables B-7 and B-8) to the forest habitat group. Because these dominant threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Woodland Habitat Group **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the forest habitat group or its TEPCS populations are 4.1a, 4.1b, 4.1c, 5.1, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Grazing, roads (construction, reconstruction, and maintenance), and non-native plants appear to be the dominant threats (Table B-9) to the woodland habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Shrubland Habitat Group **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the shrubland habitat group or its TEPCS populations are 4.2, 5.2, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads (construction, reconstruction, and maintenance), ORV use, fire (inclusion and exclusion), and non-native plants appear to be the dominant threats (Table B-10) to the shrubland habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Grassland Habitat Group **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the forest habitat group or its TEPCS populations are 5.1, 5.2, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads (construction, reconstruction, and maintenance), mechanical activities associated with timber harvest (in surrounding forested vegetation), ORV use, fire (inclusion and exclusion), and non-native plants appear to be the dominant threats (Tables B-11 and B-12) to the grassland habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Riparian Habitat Group **–** RCAs have been determined for the Ecogroup. Within the RCAs, certain standards and guidelines have been developed to prevent degradation within riparian areas. The management objectives, standards, and guidelines for RCAs are similar across all alternatives except alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan direction but does address restoration impacts as directly as other alternatives.

Given the RCA standards and guidelines, the MPCs that would allow the type and intensity of management activities that could potentially affect the riparian habitat group or its TEPCS populations are 3.1, 3.2, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing and exotic weed invasion have been documented as dominant threats for this habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Rock Habitat Groups **-** The MPCs that would allow the type and intensity of management activities that could potentially affect the rock habitat groups or its TEPCS populations are 4.1a, 4.1b, 4.1c, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Roads (construction, reconstruction, and maintenance), livestock grazing, ORV use, and recreational uses appear to be the dominant threats for the rock habitat group (Tables B-19, B-20, B-21, and B-22). Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Direct and Indirect Effects by Alternative

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's Four-o'clock) -** Currently, the only potential habitat that may exist for *Mirabilis macfarlanei* is found along the Snake River on the Payette National Forest in the Hells Canyon Management Area. The entire management area was analyzed for this rare species. Thus, the amount of potential habitat for *Mirabilis macfarlanei* is overestimated. Forested, shrubland, and woodland habitats were included in this management area, as well as the grassland habitats that are actual potential habitat.

The potential for moderate to high levels of impacts to all grassland species exists for all alternatives (as described above). Alternative 5 poses the highest risk to the potential habitat for *M. macfarlanei.* In this alternative, the major proportion (92 percent) of the potential habitat area is assigned to MPC 6.1, and a minor portion (8 percent) is assigned to MPC 5.2. Noxious weeds, mechanical effects, recreation and livestock use would have moderate to high potential impacts to the *M. macfarlanei* potential habitat. Fire use would be moderate. All of these potential impacts have been identified, currently, as posing the highest threats to this threatened species (see above and Appendix G, Tables G-3, G-4, and G-5), thus making this alternative the riskiest of the seven. Alternatives 3, 2, and 1B would have intermediate levels of potential impacts to the potential habitat for this threatened species. The portions of the potential habitat assigned to MPC 6.1 are much less in these alternatives, and there is no 6.2. Additionally, these alternatives have portions of the area assigned to MPC 4.1b or 4.1c. Although the risk of fire is high and livestock use is moderate, potential impacts from recreation, mechanical activities, and noxious weeds are low to moderate. Given the current threats from noxious weeds, mechanical activity, and recreation to *M. macfarlanei* populations, the potential habitat would benefit from alternatives in which these threats are lower. Alternatives 7 and 6 have low potential impacts to the potential habitat for *M. macfarlanei* due to the large portions assigned to undeveloped and semi-primitive recreation (MPCs 4.1a, 4.1c). These MPCs have lower potential impacts for noxious weeds, livestock use, and mechanical activities, while the risk of fire use is still high. Alternative 4 would have the least potential impact to the potential habitat for *M. macfarlanei*. In this alternative, a significant portion (76 percent) of the management area is assigned to recommended wilderness. This MPC has low potential impacts for most indicators (no mechanical treatments allowed) except fire, which is high). The remaining portion is assigned to MPC 3.2 (restoration and maintenance of aquatic, terrestrial, and hydrologic conditions) with low to moderate potential impacts for livestock use, recreation (low), and mechanical activities. Fire use and noxious weeds have moderate to high potential impacts.

Spiranthes diluvialis **(Ute Ladies'-tresses Orchid) and** ***Howellia aquatilis*** **(Water Howellia) -** RCAs will provide certain standards and to prevent degradation within riparian areas. The management objectives, standards, and guidelines for RCAs are similar across all alternatives except Alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan. All alternatives would have moderate to high impacts for the riparian habitat group. Of these, Alternative 5 presents the most potential for adverse impacts to *S. diluvialis* and *H. aquatilis* potential habitat. A substantial proportion (66 percent) of the potential habitat for these species is assigned to MPC 5.1, which has moderate or moderate to high potential impacts for all indicators (low to moderate for grazing and recreation). Given the current documented threats (Appendix G, Tables G-3, G-4, and G-5) and the moderate to high-risk form noxious weeds and mechanical activities in potential habitat for these species, Alternative 5 presents the greatest potential impacts. Alternative 3 and 2 had slightly higher impacts with the high proportions of MPC 3.2 (71 percent - 3, 63 percent - 2) would increase the potential for impacts, including those that are documented as threats currently. Livestock grazing and, mechanical activities would pose low to moderate impacts, while fire use would be moderate, recreational impacts would be low, and noxious weeds would pose moderate to high potential impacts in these alternatives. Alternative 7 has moderate potential impact for *S. diluvialis* and *H. aquatilis* potential impact. The amount of MPC 3.1 (48 percent) would have lower potential impacts than MPC 3.2 for most indicators, though recreation may slightly higher in 5.1 (Table B-25). Portions of potential habitat are assigned to MPC 3.2 (15 percent) and 4.1c (23 percent) in this alternative, thus making it more risky than Alternative 1B (MPC 3.1 – 63 percent, 4.1B – 17 percent). Alternative 1B with the application of RHCAs and Pacfish/Infish requirements poses intermediate risks to the riparian habitat and to *S. diluvialis* and *H. aquatilis*. Alternative 4 and 6 present the lowest potential impacts to the potential habitat for these rare species. Alternative 4 has slightly more risk than Alternative 6. Alternative 4 has a greater risk from fire use than Alternative 6 because of the large amount of recommended wilderness (MPC 1.2 – 33 percent). Alternative 6 has the majority of the *S. diluvialis* and *H. aquatilis* potential habitat acres assigned to MPC 3.1 (86 percent). This MPC has low potential impacts for most indicators, although impact potential from noxious weeds is moderate.

Silene spaldingii **(Spalding's Catchfly) -** Potential habitat for *Silene spaldingii* exists in the Snake River and Salmon River canyon grasslands on the Payette National Forest and low elevation grasslands on the Boise National Forest. In the final listing rule (Federal Register, Vol. 66, No. 196, 2001), the USFWS determined that the designation of critical habitat is prudent for *S. spaldingii.* However, the limited budget for listing activities precluded the designation of critical habitat for *S. spaldingii* at this time. The final designation of critical habitat would help protect the habitat of this rare species. Approximately, 24 percent of the modeled habitat for *S. spaldingii* falls in existing wilderness (Frank Church--River on No Return). The management emphasis for existing wilderness does not change by alternative. All indicators (Table B-25) are low except fire use, which is high.

While all alternatives pose moderate to high level impacts to the potential habitat of *S. spaldingii,* Alternative 5 poses the greatest potential impacts based the high proportion of the potential habitat area assigned to MPCs 5.1 (10 percent), 5.2 (28 percent), 6.1 (4 percent), and 6.2 (25 percent). These MPCs have moderate to high potential risks from noxious weed and exotic species invasion, mechanical effects, and livestock use (except 5.2 and 5.1, which are low to moderate). Section 7 guidelines for *S. spaldingii* have listed these as management activities that potentially threaten existing or potential habitat and/or populations (see above and Appendix G, Tables G-3, G-4, and G-5). Alternative 1B would be similar to Alternative 5, with moderate to high threats for most indicators, although fire use would be low and grazing would be low to moderate (MPC 5.2 - 57 percent of habitat). One of the greatest threats to *Silene spaldingii* populations is habitat changes associated with fire suppression (Federal Register, Vol. 66, No. 196, 2001). In areas where the fire regime has been altered or excluded, shrubs and trees have encroached on grasslands and have contributed to a build-up in liter layer that inhibits *S. spaldingii* seed germination. Prescribed fire may have a positive effect on *S. spaldingii* by removing litter and creating habitat for recruitment (Lesica 1999). There is no 6.2 in Alternative 1B, thus making it slightly less risky than Alternative 5.

Alternatives 7, 3, and 2 would have intermediate effect on the potential habitat for *S. spaldingii.* These alternatives have large portions (48 – 60 percent) of the modeled habitat assigned to MPC 5.1 and 6.1 combined. These MPCs have moderate or moderate to high potential impacts for most indicators (Table B-25), although recreation and livestock use may be lower in MPC 5.1. Increases in noxious weeds and mechanical disturbance in this MPC may cause short-term risks to the potential habitat for *S. spaldingii* but the MPC is intended to restore or maintain vegetative diversity and may allow for long-term improvement of the habitat. Alternative 6 has less potential for impacts to S. spaldingii potential habitat than the previous alternatives. Less of the modeled habitat falls into MPCs 5.1, 5.2, and 6.1, and a large portion (21 percent) is assigned to MPC 4.1b, which would have more prescribed fire (may be beneficial) and moderate to low impacts for other indicators. Alternative 4 may have the least potential short-term impacts to the potential habitat for *S. spaldingii*; however, long-term impacts due to increased uncharacteristic disturbance (wildfire and disease) may be higher under this alternative. Half of the proposed habitat in Alternative 4 would be assigned to MPC 3.2, which has low to moderate potential for most of the indicators, although noxious weed invasion potential is moderate to high. Less than 1 percent of the potential habitat is assigned to MPC 5.1, and no potential habitat was assigned to MPCs 5.2, 6.1, or 6.2.

<u>Proposed Endangered Species</u>

Lepidium papilliferum **(Slick Spot Peppergrass)**

All alternatives pose moderate to high-level impacts to the potential habitat of *Lepidium papilliferum.* Alternative 5 poses the greatest potential impacts based on the high proportion of the potential habitat area assigned to MPCs 6.2 (74 percent) and 5.2 (18 percent). MPC 6.2 would have moderate to high potential for all indicators (Table B-25). Given the known threats (grazing, fire inclusion, noxious weed invasion, mechanical disturbance, and ORVs - Appendix G, Tables G-3, G-4, and G-5) for *L. papilliferum,* this alternative would have potentially severe impacts for this rare species. Alternative 2 would be similar to Alternative 5, with moderate to high threats for most indicators because of the large portions of MPC 6.2 (40 percent of potential habitat) and MPC 5.1 (15 percent). Alternative 3 also presents moderate to high potential impacts for *L. papilliferum* given the portions of MPC 6.2 (33 percent), 6.1 (23 percent), and 5.1 (22 percent). Alternative 1B has slightly lower risks to the potential habitat for *L. papilliferum.* Although a major portion (34 percent) is assigned to MPC 5.2 and 5.1 (22 percent), the reduced risk of fire use in this MPC 5.2 and much smaller proportion assigned to MPC 6.2 (12 percent) make this alternative slightly less risky. Alternative 6 poses lower threats to potential habitat than previous alternatives due to the major portion of habitat assigned to MPCs 4.1a (43 percent) and 4.1B (31 percent), which have low to moderate impacts for all indicators but fire. A small portion of this alternative is also assigned to MPC 6.2 (13 percent), making it slightly riskier than Alternatives 4 and 7, which have no MPC 6.2. Alternative 4 has a major portion (52 percent) of the potential habitat for *L. papilliferum* assigned to MPC 6.1. This MPC has moderate to high risks for all indicators, but the major theme of this prescription is grassland and shrubland maintenance and restoration. Areas identified as potential habitat could be benefited in the long term by such activities. Alternative 7 may have the least potential impacts for the estimated habitat of *L. papilliferum.* There are no acres assigned to MPC 6.2 and much less assigned to 6.1 (23 percent) than in Alternative 4. Additionally, a large portion of the potential habitat is assigned to MPC 4.1c (37 percent), which has low to moderate potential impacts for all indicators but fire use, which is high. There are many threats that have been documented for *L. papilliferum* (Appendix G, Tables G-3, G-4, and G-5) including habitat destruction, noxious weeds, fire inclusion and livestock grazing. Despite the higher fire risk for potential habitat in Alternative 7, the reduction in all other potential effects make this alternative the best for *L. papilliferum* potential habitat.

Candidate Species

Castilleja christii **(Christ's Indian Paintbrush) -** Of the total population, 23 percent (90 acres) occurs in the Mt. Harrison Research Natural Area, which falls under MPC 2.2**.** The management emphasis for RNAs does not change by alternative. Timber harvesting, road building, grazing, and mining are not allowed under this MPC, thus reducing the overall potential impacts for this portion of the population (See MPC 2.2 standards and guidelines).

The remaining portion of the *Castilleja christii* population, however, could be adversely affected by management activities that vary by alternative. Alternative 1B would pose the greatest potential impacts to this population due to MPCs 4.2 (50 percent of population) and 6.2 (31 percent of population). Moderate to high potential impact levels of recreational activities, noxious weeds, and mechanical activities are associated with these management prescriptions. Moderate impact levels of livestock use and fire use are associated with this alterative; however, the summit of Mt. Harrison is administratively closed to grazing and full fire suppression within the population will be emphasized (MA guideline). Alternative 5 poses the second highest potential impacts to the *C. christii* population. A substantial portion the population is assigned to MPCs 6.1 (31 percent) and 6.2 (34 percent), which pose moderate or moderate to high potential impacts for all indicators (Table B-25), and the remainder (16 percent) of the population is assigned to MPC 4.2, which has moderate to high recreational and noxious weed impacts. Also, higher levels of mechanical activities can occur in MPC 6.2. Alternatives 2, 3, and 7 would be similarly intermediate in terms of potential impacts (65 percent MPC 6.1 and 16 percent MPC 4.2 in each alternative). While these MPCs have moderate to high potential impacts for most indicators, fire use, grazing, and mechanical activities (current threats) will be much lower in MPC 4.2 than in alternatives with MPC 6.2. Alternatives 6 and 4 would pose the least potential impact to the population. Both alternatives have large portions of undeveloped or semi-primitive recreation (MPCs 4.1a and 4.1c), which have low recreational impacts, and low to moderate mechanical and noxious weed impacts for *C. christii* population. Alternative 6 would have more recreational impacts but lower risks from livestock and fire use, while Alternative 4 has more potential impact from livestock and fire use. It is important to note that in all alternatives the signed Conservation Assessment and Strategy will be implemented. This strategy ensures the only known population of *C. christii* is protected, and risks and threats are minimized.

Botrychium lineare **(Slender moonwort) –** For *Botrychium lineare* occupied habitat, Alternative 1B would pose the greatest potential impacts to this population due to MPC 4.2 in the East Fork Salmon River/White Clouds Management area. Moderate to high potential impacts levels of recreational activities, noxious weeds, and mechanical activities may occur within these management prescriptions. This population is located in an open, rocky alpine region and will likely not be impacted by mechanical activities associated with vegetation treatments, but road-building impacts and off-road use could be significantly higher. Low to moderate of livestock use and fire use are associated with the MPCs under this alterative. Alternative 5 poses the second highest potential impacts to the *B. lineare* population. In this alternative, MPC 5.1 is assigned to the management area, which poses moderate fire use, low to moderate grazing and recreation impacts, and moderate to high impacts for mechanical activities and noxious weeds. Alternatives 2, 3, and 6 would be similarly intermediate in terms of potential impacts (3.2 in each alternative). Moderate to high noxious weed impacts and moderate fire use impacts are associated with 3.2, while grazing, recreation (low), and mechanical activities have low to moderate potential impacts. Alternatives 7 and 4 would have the least impact on the *B. lineare* population area. In these alternatives, MPC 3.1 has been assigned to portion of the MA that includes the population area. Fire use, livestock use, and recreation could have low to no impacts on the population. Fire use could have low to moderate impacts. Noxious weed impacts are likely to be moderate.

Potential habitat for *Botrychium lineare* is believed to exist on the Boise, Payette, and Sawtooth National Forests. To examine the effects of the alternatives on the potential habitat for *B. lineare*, the forestland, alpine, and grassland habitat groups were examined. Full discussions of the habitat group comparisons and MPC applications are found below in the alpine, montane forest, and grassland habitat groups. In summary, (based upon these 3 habitat groups) Alternatives 5 and 1B pose the greatest threats to the potential habitat of *B. lineare* that may exist within the three habitat groups. These alternatives have substantial amounts of MPC 5.1, 5.2, 6.1, and 6.2. These MPCs pose a variety of threats (Table B-25) but the moderate to high or high impacts from noxious weeds and mechanical activities would pose the most impact to the potential habitat. In the alpine and montane forest habitat groups, Alternatives 2, 3, and 7 have intermediate impacts for the potential habitat of *B. lineare*, while Alternative 6 replaces 7 in intermediate effects in the grassland group. This intermediate rating is based upon the mix of MPCs applied within these habitat groups. Alternative 6 and 4 (except grassland, which is 7 and 4) would have the least impact to the potential habitat of *B. lineare*. This low rating is based upon the large amounts of MPC 1.2, MPC 4.1a, b, or c, and/or MPC 3.2. Although fire may be moderate or high (Table B-25) in these MPCs, other indicators range from none to moderate depending on the MPC and are much lower in potential impacts than other MPCs described above.

Habitat Group Analysis

Commonalities Between Alternatives (Wilderness, RNAs, RCAs) - All 7 alternatives have several features in common which would pose the same potential impacts for the 86 TEPC, current or proposed sensitive species, and watch species. This includes the existing designated Wilderness (MPC 1.1), Research Natural Areas (MPC 2.2), and Boise Basin Experimental Forest (MPC 2.3). These administrative designations and their management prescriptions will remain the same across the range of alternatives. RCAs or RHCAs would also provide similar management direction for the seven alternatives. In these areas, any proposed action would be implemented to either maintain current conditions or to achieve desired conditions for soil, water, riparian, or aquatic resources. Only those actions that would benefit riparian resources over the long-term would be permitted.

Alternative Effects by Habitat Group – The following is an analysis of the effects on the different habitat groups by alternative.

Alpine - Effects from the alternatives do not vary greatly for the alpine habitat. An estimated 8 percent of the alpine acres exist in designated wilderness (MPC 1.1), which would not change between the alternatives. Livestock grazing, recreation, roads, ORV use, and non-native plants were documented (Table B-5) as current threats. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternative 5 would have the most potential effects to botanical alpine habitat group and TEPSC or watch species due to the number of MPCs with threats to alpine plants 4.1c (46 percent), 4.2 (24 percent), 5.1(7 percent) and the higher amounts of TEPSC or watch species populations in MPCs 6.1 (11 percent) and 6.2 (2 percent). Most of these impacts would be moderate to high in intensity. Livestock use and noxious weeds (current threats) were the primary potential impacts in Alternative 5, as reflected by the MPCs. Additionally, unlike all other alternatives, Alternative 5 has no alpine acres assigned to MPC 1.2. The other alternatives range from 69–91 percent of acres assigned to MPC 1.2. In MPC 1.2, all indicators, with the exception of fire use, are none to moderate (majority are low). Fire use is high under MPC 1.2 but alpine species will likely receive little impact from wildland fire given the sparse fuels and rocky nature of the habitat. Alternative 1B would present the next greatest risk to the alpine habitat group. Despite the large portion assigned to MPC 1.2 (69%), the portions assigned to MPCs 4.2 (9 percent) and 6.2 (5 percent) would have moderate to high impacts for all indicators (Table B-25) except fire use and livestock grazing in MPC 4.2, which would be low to moderate. Alternatives 3, 7, and 2 would have intermediate impacts to the alpine habitat groups. Large portions of the alpine acres are assigned to MPCs 1.2 (69 – 73 percent), which would likely result in low impacts to the alpine groups (see fire discussion above). Alternative 2 (2 percent) has less MPC 4.1c than Alternatives 7 (14 percent) and 3 (11 percent), while they all have similar amounts of MPCs 3.1 (3 percent) and 3.2 (3 percent). Alternative 6 poses lower impacts to the alpine habitat group than previous groups due to the large portions of the acres assigned to MPC 1.2 (70 percent) and MPC 4.1a (22 percent). These MPCs have low impacts for most indicators with the exception of fire. As discussed previously, fire would likely have little impact on the alpine habitat group. Alternative 4 poses the least impact to plants in the alpine habitat, with the majority of the alpine acres assigned to recommended wilderness (MPC 1.2 - 91 percent).

Subalpine Forest/Non-Forest – Effects from the alternatives would vary greatly for the subalpine habitat group. An estimated 21 percent of the subalpine acres exist in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Recreational uses, livestock grazing, roads, ORVs use, fire (inclusion and exclusion) and non-native plants were documented (Table B-5) as current threats for the subalpine habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Both Alternatives 5 and 3 have the highest potential impacts to the subalpine habitat group and the TEPSC or watch. In Alternative 5, high amounts of MPCs 4.1c (16 percent), 4.2 (11 percent), 5.1 (19 percent), and 5.2 (20 percent) all have relatively moderate or high potential impacts from livestock use, recreational impacts (low in 4.1c), and noxious weed invasion. Mechanical activities could also impact subalpine species and their habitat. In Alternative 3, MPC 3.2 (25 percent) would occur across larger amounts of acreage than in other alternatives. MPC 3.2 poses low recreational impacts, moderate impacts from fire, low to moderate livestock use and mechanical effects and moderate to high potential impacts from noxious weeds. MPCs 5.1 (13 percent), 1.2 (19 percent) and 4.1c (12 percent) also pose risk to the subalpine species in this alternative due to moderate (5.1) to high (1.2 and 4.1c) fire use. Many of these impacts may be short term due to management activities associated with active restoration. Alternatives 1B, 2, and 7 would have intermediate impacts on the subalpine habitat group. Alternative 1B has no MPC 3.2 but does have a large portion of MPCs 5.1 (11 percent), 5.2 (6 percent), and 6.2 (4 percent), which have moderate to high impacts for many of the indicators (fire is low and grazing is low to moderate in MPC 5.2, grazing and recreation are low to moderate in 5.1). Alternatives 2 and 7 have a moderate portion of MPC 3.2 (14 percent and 15 percent, respectively) but Alternative 2 has more MPC 5.1 (9 percent vs. 5 percent). All three alternatives have a moderate portion of MPC 4.1b (1B – 26 percent, 2 – 25 percent) or 4.1c (7 - 20 percent). These undeveloped recreation MPCs pose low to moderate potential impacts for all indicators except fire, which is high. Alternatives 4 and 6 demonstrate the least potential to affect the subalpine habitat group. In Alternative 6, less of the total subalpine acres are assigned to MPC 1.2 (19 percent), with the majority of acres assigned to 4.1a (47 percent). Fire impacts may be high and livestock use impacts may be moderate. Alternative 4 may have the lowest potential impacts to the subalpine habitat group of all alternatives. Alternative 4 has a major portion of the subalpine acres (59 percent) assigned to recommended wilderness (MPC 1.2) and a small portion (6 percent) assigned to MPC 3.2. While the potential impacts from grazing, mechanical, and recreation are none to moderate, fire and noxious weed impacts may be moderate to high.

<u>Montane Forest</u> – The potential effects to the forest group would vary widely between alternatives. An estimated 17 percent of the montane forest acres exist in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Fire (inclusion and exclusion), timber harvest, livestock grazing, roads, fire suppression, and were documented (Tables B-7 and B-8) as current threats for the montane forest group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternative 5 would have the most potential for impacts to the montane habitat group and TEPSC or watch species due to the large number of acres assigned to MPCs 5.2 (40 percent) and 5.1 (20 percent). Moderate to high potential impacts from mechanical activities and noxious weeds pose the greatest threats to the species in this alternative. Alternative 1B also poses high potential impacts for the montane forest group due to large portions of acres assigned to MPC 5.2 (27 percent), 5.1(17 percent), and 4.2 (9 percent). Noxious weeds, recreation (low to moderate in 5.1) and mechanical impacts are moderate to high for these MPCs, while livestock use and fire use are moderate to low. Alternative 3 poses the next highest potential for impacts to these species through MPC 5.1 (35 percent) and MPC 3.2 (23 percent). Noxious weeds have moderate or moderate to high potential impacts, fire use would have moderate impacts, and mechanical activities would have low to high impacts depending on MPC (Table B-25). Alternative 3 may not pose as many long-term risks, as it seeks to restore ecosystems to a desired historic range of natural variability. However, risks in the short term would be moderate to high due to the increased management associated with restorative activities. It is important to note however, that fire and disturbance events may allow for increased light to penetrate the forest gaps and create favorable conditions for new seedling establishment for those species that require open gaps within forested habitat groups (Table B-7). Alternative 2 and 7 are very similar in terms of intermediate effects to the montane forest habitat group. Both have a wide mix of MPCs assigned to the habitat group, including MPC 4.1a, 4.1b, 4.1c, 5.1, 5.2 and 6.1 (each less than 26 percent of acres). Alternative 7 does have more MPC 3.1 (13 percent) than Alternative 2 (2 percent). Grazing and mechanical impacts would be none to low in this MPC, while fire use and recreation are low to moderate. Noxious weeds would pose a moderate risk in MPC 3.1. Alternatives 4 and 6 propose the least amount of potential impacts to the montane habitat group. In both of these alternatives, the intensity of the risks posed by the combination of MPC's is less than in the other alternatives (Table B-25). Alternative 6 may pose slightly more risks to montane forest group. While a large

portion of the forest acres are assigned to MPC 4.1a (36 percent) and 4.1b (14 percent) (low to moderate impacts except fire, which is high), more of the acres are assigned to MPCs 5.1 (13 percent) and 5.2 (5 percent), which have moderate to high impacts for all indicators except livestock grazing and fire, which are low to moderate. Alternative 4 has large portions assigned to recommended wilderness (36 percent MPC 1.2), MPC 3.2 (20 percent), and MPC 3.1 (12 percent). Both of these alternatives pose high risk of uncharacteristic wildfire, however, to known populations of current or proposed sensitive species occurring in MPCs 1.2 and 4.1. Although the short-term risk is low in MPC 1.2 and 4.1, the longer-term risk of uncharacteristic wildfire is a potential threat. It should also be mentioned that existing wilderness (MPC 1.1) poses high risk for all alternatives in the forest habitat, again due to the threats of uncharacteristic wildfire and the decreased ability to detect new infestations and establishment of noxious weeds (low to moderate in Table B-25).

Woodland - The potential effects to the woodland group do not vary widely between alternatives. Large portions of MPC 6.1 and 6.2 were assigned in most alternatives. Only a small portion (4 percent) of the woodland habitat group exists in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Livestock grazing, roads, and non-native plants were documented (Table B-9) as current threats in the woodland habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternatives 1B and 5 pose the greatest potential impacts to the woodland habitat group based on moderate to high levels of livestock use, recreation, mechanical disturbance and noxious weeds. Alternative 5 has over 81 percent of the acres assigned to MPCs 5.1, 5.2, 6.1, and 6.2. These MPCs all have moderate to high risk for all indicators (Table B-25) except fire, which is low only in MPC 5.2 (30 percent in Alternative 5). Alternative 1B also has high potential impacts through MPC 6.2 (37 percent), 5.2 (16 percent), and 4.2 (18 percent), in which recreation, mechanical activities, and noxious weeds pose moderate, moderate to high, or high risks. Fire use may be lower in this alternative than others (low in 5.2, low to moderate in areas with 6.2 and 4.2). Alternatives 3, 2, and 7 were rated intermediately in the woodland habitat group; each would pose threats in MPC 6.1 (37, 28, and 30 percent respectively) due to the distribution of TEPSC or watch species occurrence and the moderate or moderate to high potential threats associated with this MPC. Alternatives 3 and 7 have more MPC 3.2, which may have higher threats from fire and noxious weeds. As with all discussions with Alternative 3 and 7, many impacts may be short term, but the potential to increase habitats beneficial to the sensitive species and the habitat group would be improved in the long term. The ability to detect weeds in such projects may offset the moderate to high (Table B-25) threat associated with this MPC. Alternative 4 has lower potential impacts to the woodland group than the previous alternatives. The major MPCs assigned in this alternative (1.2 – 28 percent, 3.2 – 20 percent, and 6.1-23 percent) have a wide range of potential impacts but noxious weeds and fire will likely have moderate to high impacts. Alternative 6 would pose the least potential impact to the woodland habitat group. A large portion of the woodland acres in this alternative are assigned to MPC 4.1a (42 percent) and 4.1B (23 percent), which have low to moderate potential impacts for all indicators but fire. In aspen woodland habitat, fire can be beneficial for recruitment and population vigor. Pinyon-juniper communities, however, may be slow to recover from wildland fire and therefore fire use may pose more threats to the group. Noxious weeds, a dominant threat for this group, could pose a problem in all alternatives, given the large portions of each alternative assigned to MPCs with moderate to high potential impact for weed infestation and spread.

Shrubland - All of the alternatives have the potential for moderate to high level of impacts to shrubland species, based on MPC assignments. As with the woodland group, large portions of MPC 6.1 and 6.2 were assigned in most alternatives. Only a small portion (4 percent) of the shrubland habitat group exists in designated wilderness (MPC 1.1). Livestock grazing, roads, ORV use, fire (exclusion and inclusion) and non-native plants were documented (Table B-10) as current threats in the shrubland habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. The large amount of MPC 6.2 (35 percent) and 5.2 (26 percent) in Alternatives 5, and MPCs 6.2 (36 percent) and 5.2 (17 percent) in Alternative 1B, make these alternatives risky for the shrubland habitat group, given the moderate to high risk for all indicators (fire use low in 5.2) and the current threats documented in this habitat group. Alternative 3 follows closely behind: MPC 6.1 (32 percent), 5.1 (21 percent) and 4.1c(10 percent). Potential impacts from livestock use, recreation, mechanical activities; fire use and noxious weeds would be moderate or moderate to high in MPC 6.1 and 5.1 (grazing low to moderate). MPC 4.1c has high potential impact from fire, moderate impacts associated with livestock grazing, and low or low to moderate impacts for recreation, mechanical activities, and noxious weeds. Alternative 2 and 7 pose similar threats to the shrubland group. Alternative 6 has lower potential impacts for the shrubland group than previous alternatives. MPCs 4.1a (41 percent) and 4.1B (23 percent) are dominant in this alternative and have lower impacts for most indicators except fire and livestock use. Alternative 4 has the least potential for affecting the species in shrublands. Large portions of the shrubland acres are assigned to MPC 1.2 (25 percent) and 3.2 (20 percent), which have lower impacts from recreation, livestock grazing, and mechanical activities, which have been documented as dominant threats (Table B-10). Fire may be higher than in other alternatives but many of the shrubland species are threatened by the lack of fire and could be benefited by fire use (Appendix G, Tables G-3, G-4, and G-5). It is important to note that this habitat group has a higher potential for impacts than other habitat groups. This is mainly due to the potential impacts from relatively high amounts of MPCs 6.2, 6.1 and 5.2 in all of these alternatives.

Grassland - Potential effects to the grassland group appear to vary widely between alternatives. An estimated 12 percent of the montane forest acres exist in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Livestock grazing, roads, mechanical activities associated with timber harvest (in surrounding forest vegetation), fire (inclusion and exclusion), ORV use, and non-native plants were documented (Table B-11 and B-12) as current threats in the grassland habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternative 5 has a high level of potential impacts associated with MPCs 5.1 (15 percent), 5.2 (34 percent), and 6.2 (26 percent), making it the riskiest for the species in grassland environments. Noxious weeds, mechanical effects (moderate to high), and livestock use (low to moderate – 5.1 and 5.2) were most prevalent among the threats from management activities in these MPCs and have been documented as dominant threats in this habitat group. Alternative 1B and 3 also pose moderate to high potential threats to the grassland habitat group. High levels of MPCs 5.2 (47 percent -1B) and 5.1 (38 percent - 3) pose the greatest threats to the grassland species in addition to MPC 6.2 (9 percent - 1B, 7 percent -3). Impacts from current threats and management activities could be increased as a result of MPC assignment. Noxious weeds and mechanical activities could be moderate to high in these alternatives along with moderate fire use, low to high impacts from livestock grazing (5.1 and 5.1 low to moderate, 6.2 moderate to high) and low to high recreation (5.1 low to moderate, 5.1 moderate, 6.2 moderate to high). Alternatives 2 and 6 would have intermediate effects on the grassland habitat group. Both have a mix of MPCs 3.2, 4.1a or 4.1b, 5.1, 5.2, and 6.1 (each less than 27 percent of total). Alternative 2 also has 11 percent of the grassland acres assigned to MPC 6.2, which has moderate, moderate to high, or high impacts for all indicators (Table B-25). Alternatives 7 and 4 may have lower potential impacts because no acres are assigned to MPC 6.2, which may increase the current threats given the management activities and emphases allowed in this MPC. Alternative 7 does have 18 percent of the acres assigned to MPC 5.2 and 21 percent assigned to MPC 6.1, which have moderate to high impacts for most indicators (fire and livestock use are low and low to moderate respectively in MPC 5.2). Although Alternative 4 has a large proportion assigned to MPC 3.2 (38 percent) and MPC 1.2 (19 percent), which have moderate to high potential impacts from fire and noxious weeds, the impacts from recreation, livestock grazing, and mechanical activities are much lower than they would be in Alternative 7.

Riparian - RCAs will provide certain standards and to prevent degradation within riparian areas. The management objectives, standards, and guidelines for RCAs are similar across all alternatives except alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan. Livestock grazing and non-native plants were documented (Tables B-13, B-14, B-15, B-16, B-17, and B-18) as dominant current threats in the riparian habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives.

All alternatives would have moderate to high impacts for the riparian habitat group. Of these, Alternative 5 presents the most potential for adverse impacts to the riparian habitat group. A substantial proportion (66 percent) of the potential habitat for these species is assigned to MPC 5.1, which has moderate or moderate to high potential impacts for all indicators (low to moderate for grazing and recreation). Given the current documented threats (Tables B-13, B-14, B-15, B-16, B-17, and B-18) and the moderate to high-risk form noxious weeds and mechanical activities in MPC 5.1, Alternative 5 presents the greatest potential impacts to the riparian group and the TEPSC or watch species that occur there. Alternative 3 and 2 had slightly higher impacts with the high proportions of MPC 3.2 (71 percent - 3, 63 percent - 2) would increase the potential for impacts, including those that are documented as threats currently. Livestock grazing and, mechanical activities would pose low to moderate impacts, while fire use would be moderate, recreational impacts would be low, and noxious weeds would pose moderate to high potential impacts in these alternatives. Alternative 7 has moderate potential impact for the riparian habitat group. The amount of MPC 3.1 (48 percent) would have lower potential impacts than MPC 3.2 for most indicators, though recreation may slightly higher in 5.1 (Table B-25). In this alternative, riparian habitats are assigned to MPC 3.2 (15 percent) and 4.1c (23 percent), thus making it more risky than Alternative 1B (MPC 3.1 – 63 percent, 4.1B – 17 percent).

Alternative 1B with the application of RHCAs and Pacfish/Infish requirements poses intermediate risks to the riparian habitat. Alternative 4 and 6 present the lowest potential impacts to the riparian habitat group and TEPSC or watch species. Alternative 4 has slightly more risk than Alternative 6. Alternative 4 has a greater risk from fire use than Alternative 6 because of the large amount of recommended wilderness (MPC 1.2 – 33 percent). Alternative 6 has the majority of the *S. diluvialis* and *H. aquatilis* potential habitat acres assigned to MPC 3.1 (86 percent). This MPC has low potential impacts for most indicators, although impact potential from noxious weeds is moderate.

<u>Rock</u> – The effects to the rock habitat group varied by alternative. A major portion of the rock habitat acres (34 *percent*) exists in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. As with the grassland group, the MPC assignment is based upon the dominant vegetation. Many of the rock outgroups or groupings occur within forested, grassland, woodland, and shrubland habitats. Impacts to the rock habitat group by MPC may therefore be overestimated. Roads, livestock grazing, ORV use, and recreation uses were documented (Tables B-19, B-20, B-21, and B-22) as current threats in the rock habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. In all alternatives but 5, a substantial proportion is assigned to recommended wilderness (MPC 1.2 – 19 *percent* in 1B, 2, 3, 6, - 48 *percent* in 4). MPC 1.2 has low to moderate (mechanical none) potential impacts for most indicators. Fire use is high under this MPC but given the nature of this habitat group, fire is not a likely threat. Alternative 5 has no MPC 1.2, and has portions assigned to 5.1 (14 *percent*) and 5.2 (14 *percent*). Impacts associated with forested vegetation treatment may pose threats to portion of the rock habitat group. Logging decks and associated timber harvest disturbance have been documented in the decomposed granitic outcrop group because many of these outcrops are flat, and open in nature (Table B-21). Alternatives 1B, 2, and 3 were intermediate in potential effects. Each had a portion assigned to undeveloped recreation (MPCs 4.1a, b, and c) and varying amounts of MPC 5.1, 5.2, 6.1, and 6.2 (no 5.2 in Alternative 3). In MPC 4.1(a, b, c), grazing would be moderate and recreation, mechanical activities, and noxious weeds would be low to moderate. As with recommended wilderness (MPC 1.2), the risk from fire is high. Wildland fire and prescribed fire should have little impact on the species in this habitat group if staging areas and suppression activities do not occur within TEPSC rock species habitat. Moderate to high impacts from mechanical activities and noxious weeds may occur in MPCs 5.1, 5.2, 6.1, and 6.2. Recreation, grazing, and fire use vary by alternative and magnitude of impact based upon the MPC standards and guidelines and MPC themes. Alternatives 6, 7, and 4 have the lowest potential impacts for the rock habitat group. Alternative 6 has a major portion (34%) assigned to MPC 4.1a, which will have low to moderate impacts for all indicators except fire, which is high (although fire is not as risky for this habitat type). Alternative 7 and 4 have portions assigned to MPC 3.1 (10 and 6 percent, respectively), which have none to low potential impacts from livestock grazing and mechanical activities, low to moderate impacts for fire use and recreational activities, weeds, which are moderate. All alternatives will likely pose lower threats for this habitat group than other groups given the nature of the habitat. Activities associated with surrounding vegetation and disturbance will be the main cause of potential impact for these species.

Long-term vs. Short-term Benefits and Impacts by Alternative

In all alternatives, short-term and long-term risks and impacts are inherent with all land management activities and objectives. The habitat group discussions above focus on the apparent short-term and long-term risks and impacts of each alternative. However, the long-term and short-term benefits of each activity weighed against these impacts are not addressed in depth. We attempt here to outline the benefits and impacts to the 86 TEPC, current or proposed sensitive or watch species by alternative.

Alternative 1B is the No Action Alternative and has intermediate short-term and long-term benefits and impacts to the 86 TEPC, current or proposed sensitive, or watch species. Management activities are low to moderate in watersheds with listed aquatic species, and vegetation restoration is limited due to the short-term impacts to watershed, riparian, and aquatic resources. The short-term benefits of low to moderate activity must be weighed against the potential long-term impacts in these areas, which include increased levels of uncharacteristic wildfire and insect and disease outbreaks. Outside of watersheds with listed fish species, management for growth and yield and rangeland utilization is emphasized, thus posing greater short-term impacts to the current or proposed sensitive species. These high levels of management activity, however, are designed to provide the long-term benefits that include minimization of insect, disease, and uncharacteristic wildfire. Currently, under this management direction, 13 of the 86 TEPC, current or proposed sensitive, or watch species (Table B-23) have threats that are contributing to a declining population trend on National Forest System lands or other lands and the habitat group or groups to which they belong (Appendix G, G-3, G-4, and G-5). Temporary or short-term disturbance in these areas may allow these populations to recover or move successional conditions to appropriate levels to support the viability of these species. It is important to consider however, that some short-term risks if not properly mitigated could severly impact plant populations.

Alternative 2 addresses the need for change, and allows a mixture of uses and restoration activities, and not unlike Alternative 1B, provides intermediate short-term and long-term benefits and impacts to the 86 TEPC, current or proposed sensitive, or watch species. Resources with low resiliency and integrity are restored within a range of desired conditions. Thus, short-term risks to the TEPC, current or proposed sensitive, or watch species due to restoration activities are high but may be offset by the long-term benefits of reducing risk to uncharacteristic disturbance. Although some of the TEPCS or watch species are adapted to natural fire conditions or are currently threatened due to fire exclusion (Appendix G, Table G-4, fire exclusion threat), uncharacteristic fire may severely impact all populations of plant species. Conversely, those resources that are resilient or resistant to disturbance are not treated or receive only custodial maintenance. The forest open gap species (Table B-7) could benefit from additional forest disturbance and may have less optimal habitat conditions at the custodial or maintenance level. The short-term benefit of low to moderate levels of management activity reduces short-term impacts to the TEPC, current or proposed sensitive, or watch species, but long-term risks increase due to the unpredictability of uncharacteristic disturbance (wildlife and insect/disease). The magnitude and severity of such uncharacteristic disturbance events, once they occur, will also increase over time.

Alternative 3 may not pose as many long-term risks as other alternatives, as it seeks to restore ecosystems to a desired historic range of natural variability. Though the risks in the short-term are high due to the increased management associated with restorative activities, these activities should improve the habitat for the TEPC, current or proposed sensitive, or watch species in the long-term. Several species (9 of 86 TEPC, current or proposed sensitive, or watch species, Appendix G, Table G-4, fire exclusion threat) would benefit from restoration of historical fire regimes and the creation of open patches across the landscape. Other species (8 of the 86 TEPC, current or proposed sensitive, or watch species) suffer from insects and disease threats (Appendix G, Table G-4) that could be addressed and minimized through the restoration activities of Alternative 3. Currently, 18 of 86 (21 percent) of the TEPC, current or proposed sensitive, or watch plant species currently are impacted by changes in the hydrologic regime. Restoration of riparian resources could benefit these species and their habitat as well. Perhaps the greatest common threat within the Ecogroup is noxious weed infestation and establishment. At present, 22 of the 86 (26 percent) of the TEPC, current or proposed sensitive species are impacted by non-native plant invasion and/or noxious weed invasion. Restoration activities may help reduce noxious/non-native plant invasion in the long-term but may contribute to their establishment in the short-term.

Alternative 5 emphasizes production of goods and services with the sustainable limits of the Ecosystem, including growth and yield on suited timberlands and livestock forage. The short-term risks to the 86 TEPC, current or proposed sensitive, or watch species are greatest under this alternative. Currently, 46 of the 86 (53 percent) TEPC, current or proposed sensitive, or watch species are impacted by activities associated with grazing (Appendix G, Table G-3, grazing threat). Recreational activities currently impact 25 of the 86 (29 percent) TEPC, current or proposed sensitive or watch species (Appendix G, Table G-3). In addition, 20 of the 86 (23 percent) TEPC, current or proposed sensitive, or watch species (Appendix G, Table G-3, logging threat) are currently impacted by timber harvest activities. Increased levels of all these activities along with other management activities pose extreme short-term risks to all the TEPC, current or proposed sensitive, or watch species. These management activities may, however, promote long-term benefits, which include decreased risk of tree mortality, and other negative impacts from uncharacteristic disturbance (insect, disease, and wildfire).

Alternatives 4 and 6, while benefiting TEPC, current or proposed sensitive, or watch species in the short-term due to minimal management activity, pose the greatest long-term threats due to uncharacteristic wildfire, increased incidence of insects and disease, and increased susceptibility to uncharacteristic disturbance. Species in the montane understory habitat group (Table B-8, Appendix G, Tables G-2, G-4) would be at greatest risk from uncharacteristic wildlife, due to their increased susceptibility to uncharacteristic disturbance. As stated above, several species (8 of the 86 TEPC, current or proposed sensitive, or watch species) are adversely affected by insects and disease. In addition, many of the TEPC, current or proposed sensitive, or watch species have extremely small populations (Appendix G, Table G-2, G-4), thus making them more susceptible to natural conditions and stochastic events, such as disease outbreak (Appendix G, Table G-4, natural conditions threat). With no intervention or restoration efforts to combat disease or insect outbreaks, several species could be at a greater risk of extinction under these alternatives.

Alternative 7 may provide intermediate impacts to TEPC, current or proposed sensitive, or watch species as this alternative attempts to provide for the undeveloped character of inventory roadless areas (IRAs), while moving toward desired future conditions through restoration for aquatics, riparian, terrestrial, and vegetational conditions and to provide for sustainable levels of goods and services on the roaded portions of the National Forests. This alternative protects plant, animal, and aquatic species that are listed or proposed for listing under the ESA by providing management direction that has been developed specifically to reduce temporary, short-term, or ongoing impacts to these species, while providing for long-term maintenance or improvement of their habitats. An ecosystem-based management is used which balances ecological conditions, social desires, and economic considerations. Management goals are the basis for determining the mix of management actions, which moves towards DFC. Currently, 36 of the 86 (42 percent) TEPC, current or proposed sensitive, or watch species are impacted by activities associated with roads, road construction, and/or road maintenance (Appendix G, Table G-3, road threat). These species could be benefited through restoration or maintenance. Additional populations could be protected in unroaded areas by providing for the undeveloped characters of the IRA. Other threats from recreational activities (29 percent of TEPCS or watch species) and timber harvest and associated activities (23 percent TEPCS or watch species) could be reduced or prevented as part of the management activities under this alternative (Appendix G, Table G-3, recreation, logging threats). Conversely, these threats could be increased in areas in which good and services are emphasized and short-term risks are high. Site-specific mitigation will be used to attempt to offset adverse effects in all management activities.

Summary of Alternatives Effects for 86 TEPSC Plant Species

In summary, Alternative 5 has the most potential for overall impacts to the 86 TEPC, current or proposed sensitive or watch plant species. It was rated as one of the highest alternatives for effects for seven of the eight habitat groups. Alternatives 1B and 3 closely followed this, due to the short-term risks associated with these alternatives. The alternative which appears to have the least potential impact to the 86 TEPC, current or proposed sensitive, or watch species is Alternative 4, which rated as one of the lowest alternatives for effects in eight of the eight habitat groups. Alternative 6 closely followed this (seven of eight habitat groups). As stated above in the discussion, many of the impacts in Alternatives 3 or 7 are considered short-term risks, to improve habitat conditions in the long-term through restoration and maintenance of vegetative communities. Conversely, Alternative 6 and 4 were rated as lower in immediate short-term impacts, but the longer-term outlook is less predictable, particularly regarding uncharacteristic wildfire effects, and increased susceptibility to disturbance events. Alternatives 1B and 2 were generally considered as intermediate in effects across all habitat groups. Table 3-24 summarizes the alternatives by habitat groupings.

Table B-27. Summary of Potential Impacts of Alternatives for the Identified Habitat Groups

Habitat Group	Alternative with the MOST Potential Impact	Alternatives with INTERMEDIATE Potential Impact	Alternative with the LEAST Potential Impact
Alpine	5, 1B	2, 7, 3	6, 4
Subalpine Forest/Non-forest	5, 3	2, 1B, 7	6, 4
Montane Forest	5, 1B	2, 3 = 7	6, 4
Woodland	1B = 5	2, 3, 7	4, 6
Shrubland	5, 1B	3, 2, 7	6, 4
Grassland	5, 1B	3, 2, 6	7, 4
Riparian	5, 3	2, 7, 1B	4, 6
Rock	5, 1B	2, 3, 6	7, 4

Rare and Unique Communities

Rare and unique communities found in the Ecogroup are listed in Appendix G, Tables G-6 and G-7. Forest-wide management direction includes long-term goals that promote habitat restoration and maintenance of rare and unique communities. These goals include restoring ponderosa pine communities (6 of the identified rare and unique communities are ponderosa pine types), and sagebrush (*Artemisia sp.*) communities (5 of the 36 identified communities). Again, some of the alternatives would accomplish this more effectively, particularly those providing for more restoration activities (Alternatives 3 and 2). Furthermore, by providing vegetation components at amounts and distributions similar to those that existed historically, and by maintaining or restoring the ecological processes that support these vegetation components, the theory is that Forest land managers will also be providing the overall biological diversity necessary to sustain both individual species of concern and rare communities. The amounts and distributions of vegetation components would vary by alternative, depending upon the prescriptions. Those alternatives that require more active types of management (Alternatives 1B, 2, 3, and 5) would have more controlled and targeted changes to vegetation. These represent higher short-term risks to rare and unique communities. Alternatives 2, 7, and 3, with an emphasis on restoration, may have higher potential short-term impacts, but can improve the potential habitat for some of these communities in the long term. Those alternatives that rely more on natural processes (Alternatives 4 and 6) pose fewer short-term risks to the potential habitat of rare communities, but the longer-term outlook for uncharacteristic disturbance to communities may be more random and stochastic, in both space and time.

Some of these rare and unique communities are plant associations, representing the entire range of seral stages, others may be existing vegetation types. Therefore, the desired conditions for the Forest providing for a mix of seral stages, based on HRV for each type, will contribute to the variation across the landscape that would have existed historically, including potential habitat for rare and unique community types. Fire exclusion and timber harvest have decreased the mid-seral stands of many of these community types; therefore, creating a range of seral stages across the landscape would improve this condition. Furthermore, the coarse filter approach to maintain or restore potential habitat in the landscape affords some level of protection for those rare and unique communities that are as yet unsurveyed.

<u>Potential Habitat</u>
The amounts and distributions of vegetation components would vary by alternative, depending upon the objectives of the MPC. All of the alternatives, except Alternative 5, have vegetation desired conditions that fall within the HRV. Some are on the higher end of this range, particularly for components such as large trees (Alternatives 4, 6, and 3), whereas others fall on the lower side of the HRV (Alternative 1B; Alternative 2 falls within the middle of the range). Those alternatives that require more active types of management (Alternatives 1B, 2, 3, 7, and 5) would have more controlled and targeted changes to vegetation. These represent higher short-term risks to TEPCS or rare plants, and would therefore, require more intensive monitoring. Alternatives 2 and 3, with an emphasis on restoration, may have higher short-term impacts, but can improve the potential habitat for some of these species in the long term. Those alternatives that rely more on natural processes (Alternatives 4 and 6) provide for less short-term risks to the potential habitat of TEPCS or rare plants, but the longer-term outlook may be more random and stochastic, in both space and time.

Improvements in inventory technology—such as LANDSAT mapping, GIS databases, etc.—will assist with the monitoring of vegetation conditions, so that the Forests know whether vegetation components are within or moving towards DFCs. Within the Forest-wide guidelines, it is stated that suitable occupied and unoccupied habitat should be defined for TEPCS plants. Additionally to meet NEPA requirements, TEPCS plant surveys are to be conducted by botanical personnel prior to conducting land management activities. Surveys should be conducted, when possible, for species of vascular plants, bryophytes, lichens, and fungi with poorly known ranges to determine distributions and abundance. This monitoring, at both the coarse and fine scales, should have the overall beneficial effect of identifying potential habitat for TEPCS plants under all alternatives.

Cumulative Effects

Cumulative effects are defined as those impacts on the environment that result from the incremental effects of an action when it is added to past, present, and foreseeable future actions, regardless of the parties, government agencies or otherwise, responsible.

The alternatives provide land and resource management direction for those lands within the Ecogroup that are administered by the Forest Service. Forest Service botanists and ecologist will continue to coordinate with American Indian tribes, other federal agencies, state and local agencies, university researchers, ICDC, and other resource advisory councils to further minimize or avoid adverse cumulative effects for all TEPCS species, rare and unique communities, and potential habitat.

<u>Threatened Species</u>
Mirabilis macfarlanei **(Macfarlane's Four-o'clock) -** *Mirabilis macfarlanei* populations are endemic to low-elevation grasslands within in three distinct areas: the Snake River unit, Idaho County, Idaho and Wallowa County, Oregon; the Salmon River unit, Idaho County, Idaho; and Imnaha River unit, Wallowa County, Oregon. Ten populations are located within Hells Canyon National Recreation Area (NRA) and four are at least partly on lands administered by the BLM's Cottonwood Resource Area. No known populations occur within the Ecogroup, though potential

habitat may exist along the Snake River on the Payette National Forest. Maintenance of potential habitat may serve for recovery or for population expansion. Management actions--including livestock grazing, herbicide application, fire suppression, recreational activities, road and trail construction and maintenance, and reservoir level and river flow management by other agencies, organizations, and private individuals--may have detrimental effects on the populations and habitat of *M. macfarlanei.*

The USFWS (USDI FWS1999) has a current recovery plan for *Mirabilis macfarlanei*, which outlines the management actions and directives needed for the recovery of this threatened species. The guidelines, objectives, and management directives of the recovery plan will be met and upheld for all Forest Service actions under all alternatives to ensure the continued viability of existing populations and to maintain potential habitat conditions. In September 2002, the USFWS removed *Mirabilis macfarlanei* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest. However, the USFWS is attempting to gain additional information about the species' distribution and has asked that the Payette National Forest continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

***Spiranthes diluvialis* (Ute Ladies'-tresses Orchid) -** *Spiranthes diluvialis* populations are randomly interspersed throughout relatively low-elevation riparian, vernally wet, and lakeside wetlands throughout the interior western United States. Known populations have been located on a variety of land ownerships including, Forest Service lands, BLM lands, and private ownership. Potential habitat is found throughout the Ecogroup, but no occupied habitat has yet been discovered. *Spiranthes diluvialis* prefers open, early seral riparian areas for establishment, thus restoration efforts for aquatic resources may be in direct conflict with management efforts for this threatened plant species. Additional human-caused activities that may contribute to the cumulative effects for this threatened species include mining, timber harvest, livestock grazing, flood events, prescribed natural fire, reservoir level and river flow management, and road construction activities.

The USFWS (USDI FWS 1999) has prepared a Draft Recovery Plan, which outlines the management actions and directives needed to restore populations and reduce current threats. The guidelines, objectives, and management directives of the draft and final recovery plan will be met and upheld for all Forest Service actions under all alternatives to ensure the continued viability of existing populations and to maintain potential habitat conditions. Efforts to streamline recovery actions with aquatic species conservation will be made to prevent conflicts in management activities and to most effectively preserve viability of all TEPCS species.

In September 2002, the USFWS removed *Spiranthes diluvialis* from the Boise, Payette, and Sawtooth National Forests' 90-Day Species List Update and noted that future biological assessments need not address the species because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

Silene spaldingii **(Spalding's Catchfly) -** Throughout its range, most occurrences of *Silene spaldingii* are located on private land. A few of the populations are managed by state agencies, tribal land, and the Nature Conservancy. No known populations of *S. spaldingii* occur within the Ecogroup, though potential habitat does exist in the Snake River and Salmon River canyon grasslands on the Payette National Forest. The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, and loss of pollinators due to insecticide application and destruction of pollinator habitat.

Section 7 guidelines and recovery objectives were followed where potential habitat for *Silene spaldingii* occurs on the Boise and Payette National Forest. In September 2002, the USFWS removed *Silene spaldingii* from the Boise and Payette National Forests' 90-Day Species List Update and noted that future biological assessments need not address the species because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

Howellia aqualitis **(Water Howellia)**

The USFWS listed *Howellia aquatilis* (Gray) as a threatened species on July 14, 1994 (59 FR 35860). Critical habitat has not been defined or designated for *H. aquatilis* (59 FR 35860) because the USFWS does not feel it is prudent due to a possibility of increased take and vandalism. *Howellia aquatilis* has been found in Idaho, historically, in Kootenai County in 1892. It was observed in Latah County in 1968, and is still considered extant in that local (Roe and Shelly 1992). Montana has the largest population of *H. aquatilis* known in the world: 101 occurrences have been found to date all occurring in the Swan River Drainage, spanning Lake County and Missoula County and on the Flathead National Forest. Fifty-four occurrences of *H. aquatilis* are found in Washington in Spokane County, Clark County and Pierce County. In Washington, *H. aquatilis* habitat ranges from the lowlands west of the Cascades to the channeled scablands of eastern Washington (Federal Register Vol. 61, No. 186, 1996). In 1996, this species was rediscovered at five sites in Mendocino National Forest, near the original collection (Federal Register Vol. 61, No. 186, 1996). There are no extant sites in Oregon but *H. aquatilis* is historically known from four sites (Federal Register Vol. 61, No. 186, 1996) however, all attempts to relocate these historical sites have been unsuccessful. Currently, no populations of *H. aquatilis* have been located within the Ecogroup. Potential habitat for *H. aquatilis* is found in limited areas throughout the Payette National Forest. The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, seed bank destruction, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, and loss of pollinators due to insecticide application and destruction of pollinator habitat.

In September 2002, the USFWS removed *Howellia aquatilis* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest. However, the USFWS is attempting to gain additional information about the species' distribution and has asked that the Payette National Forest continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

Proposed Endangered Species

***Lepidium papilliferum* (Slick Spot Peppergrass)**

Slick spot peppergrass occurs in semi-arid sagebrush-steppe habitats on the Snake River Plain, Owyhee Plateau, and adjacent foothills in southern Idaho. There are 88 known occurrences. Of these, 70 are currently extant, 13 are considered extirpated (extinct), and five are historic (i.e., have not been relocated) (Moseley 1994, Mancuso 2000). The number of individuals at each occurrence ranges from one to 2,000 (Mancuso 2000). The total amount of occupied slick spot peppergrass habitat is less than 78.4 acres (31.8 hectares), and the amount of high-quality occupied habitat for this species is less than 3.3 acres (1.3 ha) (Mancuso et al. 1998). The documented extirpation rate for this taxon is the highest known of any Idaho rare plant species (Moseley 1994).

At present, no populations of slick spot peppergrass are located within the Ecogroup. Potential habitat for this species may exist on the Boise National Forest, specifically in the Lower South Fork Boise River, Arrowrock Reservoir, and Boise Front/Bogus Basin Management Areas. The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, fire and fire rehabilitation, loss of pollinators due to insecticide application, destruction of pollinator habitat, gravel mining, and irrigated agriculture. The most recent 90-day species list update from USFWS (dated Sept. 30, 2002) lists slick spot peppergrass on the Mountain Home Ranger District for the Boise National Forest. Botanists on the Boise National Forest will follow section 7 guidelines for *Lepidium papilliferum* for conducting surveys and evaluating project effects (USDI FWS 2002).

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush)** - The only known population of *Castilleja christii* is found on Mt. Harrison on the Sawtooth National Forest. Impacts from livestock grazing, recreational activities, and road maintenance activities have been an historical concern for the population viability of this species. In 2002, the Sawtooth National Forest developed and signed a Conservation Assessment and Strategy for *Castilleja christii* (Pierson 2002). They Conservation Assessment documents all of the baseline data and conservation actions for Christ's Indian paintbrush to date. The Strategy outlines the Minidoka District's action plan for conservation and protection for the next five-year period. The strategy has five main conservation emphasis areas: (1) examination of geographic distribution of Christ's Indian paintbrush, (2) prevention and alleviation of negative impacts to the population, (3) continue monitoring and initiate research of the population, ecology, and biology, (4) coordination with agencies and academic institutions, and (5) formation of an oversight technical team to oversee the effectiveness of the conservation measures and implementation. Specific action items are designated for each fiscal year and will be implemented as funding and resources are available. The Conservation Assessment and Strategy will be implemented under all seven alternatives. Additionally, the Sawtooth Forest is currently collaborating with the USFWS to produce a signed Conservation Agreement that would outline conservation action items for the next 10-year period. Under this agreement, the USFWS would retain Christ's Indian paintbrush as a Candidate species and would reevaluate the need for listing upon implementation of the Agreement.

The cumulative effects to this rare species may include: habitat destruction, unauthorized livestock grazing and trampling, native and introduced herbivores, herbicide drift, competition from non-native species, loss of pollinators due to insecticide application, destruction of pollinator habitat, recreational impacts, and potential ski facility expansion. However, the implementation of the Conservation Strategy, Forest-wide management direction, Forest Plan standards and guidelines for the three management areas, and continued efforts with USFWS will ensure that all possible measures will be taken to protect the *Castilleja christii* population from adverse affects of management activities and uses.

Botrychium lineare **(Slender Moonwort)** - The habitat for the slender moonwort has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. In the United States, the slender moonwort is currently known from a total of ten populations: three in Colorado (El Paso and Lake counties), two in Oregon (Wallowa County), three in Montana (Glacier County), one in Washington (Ferry County), and one on the Sawtooth National Forest. The USFWS is currently waiting for genetic confirmation of this rare species before they will place it on the Sawtooth Forest's 90-day species list. The Sawtooth National Forest is currently waiting for confirmation of this species as well. Samples were sent to Iowa State University, where Dr. Farrar (a *Botrychium* expert) is genetically analyzing this species. There are four historic slender moonwort population sites in the United States and two in Canada. Populations previously known from Idaho (Boundary County), Montana (Lake County), California (Fresno County), Colorado (Boulder County), and Canada (Quebec and New Brunswick), have not been seen for at least 20 years (Wagner and Wagner 1994).

The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, recreational impacts, habitat modifications, fire effects, successional effects, and stochastic events. If the taxonomic identity of the *Botrychium* specimens is confirmed to be *Botrychium lineare*, the Sawtooth Forest will follow section 7 guidelines for *B. lineare* for conducting surveys and evaluating project effects (USDI FWS 2002). The Boise and Payette National Forests will also continue to survey for this diminutive species and will collaborate with USFWS on all findings.

<u>Current or Proposed Sensitive or Watch Species</u>
The 79 current or proposed sensitive or watch species inhabit a diverse array of habitat and vary in their distribution across the landscape. These species are faced with a variable range of threats and differ in the degree to which Forest Service management and other management may affect their status. The amount of current scientific information and distribution data available also varies greatly among species, thus often limiting the assessment of the cumulative effects of all management activities and environmental effects on the long-term viability of such species.

Distribution on the Landscape - Greater than 32 percent of the current or proposed sensitive or watch species (25 species) are locally endemic to the regions encompassed by the Ecogroup (Table B-2). The three National Forests within the Ecogroup are responsible for a large majority of the populations of these species. Indeed, four species are found only on these National Forest System lands (Appendix G, Table G-1). Management activities--including livestock grazing, fire use, mechanical treatments such as timber harvest and road construction, and noxious weed invasion--may pose potential impacts to these species. The Forest Service endemic and local endemic species (Appendix G, Table G-1) have been identified for each specific Management Area (Chapter III, revised Forest Plans) to further ensure that project level management and planning incorporate and protect these narrowly distributed species.

Twenty percent of the current or proposed sensitive or watch species (16 species) are regionally endemic, encompassing areas of southwestern Idaho, eastern Oregon, and southeastern Washington (Appendix G, Table G-1). These species are often distributed on a variety of land ownerships including Forest Service land, BLM land, Hells Canyon National Recreation Area, State lands, and privately owned lands. There are a wide range of current and potential impacts to these species from management activities and development (Appendix G, Tables G-3, G-4, and G-5). Conversion of habitat to agriculture and urban development, road building, and herbicide drift pose the greatest threat to viability for the majority of these species. As with the Forest Service endemic and local endemic species, regionally endemic species have been identified for each specific Management Area (Chapter III, revised Forest Plans) in which they occur to further ensure that project level management and planning incorporate and protect these regionally distributed species.

Sixteen of the current or proposed sensitive or watch species (20 percent) have disjunct distributions (Appendix G, Table G-1) within the Ecogroup, meaning that these populations are substantially separated geographically from the remainder of the species' range and/or populations. The land ownership, responsible managers, threats, and viability vary widely for these species across their total distributions (Appendix G, Tables G-3, G-4, and G-5). Management Areas (Chapter III, revised Forest Plans) with these disjunct populations and species have been identified to ensure project –level management and protection.

Only a small fraction (8 percent, 6 species) of the total current and proposed sensitive or watch species have scattered distribution within Ecogroup (Appendix G, Table G-1). These species have wide overall geographic ranges (e.g., the western states) but are sparsely distributed throughout the landscape. As with the disjunct species, land ownership, threats, management responsibility, and viability vary widely for these species across their total distributions (Appendix G, Tables G-3, G-4. and G-5). The management areas in which these randomly distributed populations occur have been identified (Chapter III, revised Forest Plans) for project –level management to ensure their protection.

Some (11 percent, 9 species) of the total current and proposed sensitive or watch species have widespread distribution but are rare within the Ecogroup (Appendix G, Table G-1). These species may be distributed over a wide range of land ownerships (private, State lands, BLM, and USFS) and may be faced with varying threat levels and impacts that may affect the overall species viability (Appendix G, Table G-3, G-4, and G-5). Within the Ecogroup, the responsibility for ensuring the viability of these species, as with all other TEPCS plant species, is high. To ensure protection of these species and their habitat, project-level planning and protection is necessary. These species have been identified in the Management Area plans (Chapter III, revised Forest Plan) to ensure they are incorporated and conserved at this level.

The remaining seven species (9 percent) have circumboreal distribution (Appendix G, Table G-1). These plant species are widespread in the higher latitudes of the Northern Hemisphere, occurring in both North America and Eurasia. These species are sometimes referred to as circumpolar. The land management, threats, viability, and protection efforts can vary immensely for these species on a global level (Appendix G, Table G-3, G-4, and G-5). As with all TEPCS plant species in the Ecogroup, the Forest Service responsibility for protection is high. The Management Areas in which these populations occur have been identified (Chapter III, revised Forest Plans) to ensure their protection during project–level management.

Trends - All TEPC, current or proposed sensitive, or watch species and their habitats could be potentially impacted, positively or negatively, by the activities of management agencies, private landowners, state agencies, and human impacts. However, several species may be more susceptible to these potential impacts (fire, grazing, recreation, mechanical treatments, noxious weed invasion) given their population trend. Currently, 13 TEPCS species (Table B-23) are known to have declining population trends. These species would be at greater risk of loss or habitat destruction from the impacts of all management and human activities than those with stable (Appendix G, Table G-2) or increasing (none currently within the Ecogroup) trends. For many of the sensitive species, little to no current information is known concerning biology, threats, or population trends, thus making the estimation of cumulative effects difficult. Within the Ecogroup, 26 species (Table B-24) have little research or information to determine their population trend on National Forest lands. The remaining 47 species (55 percent of the total current and proposed sensitive plant species) are currently stable on National Forest System lands (Appendix G, Table G-2). Efforts to increase information concerning trends, biology, and viability, and to preserve existing populations will be made for all TEPCS species.

Mitigation - Management efforts are already in place in an attempt to offset the cumulative effects that may occur under management activities. The National Forest Service (FSM 2670 and FSH 2609.25, 1.25) Management Policy ensures that for all TEPCS plant species, declining or otherwise, the following measures will be taken: (1) biological evaluations will be written for all activities that may impact sensitive species and their habitat, (2) "effects" of activities will be determined as similar to those for threatened, endangered or proposed species, and (3) sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for federal listing. This National Forest Service Management Policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved.

In the previous forest plans, little if any management direction was provided for TEPCS or watch species. Indeed, only the Payette National Forest had a single standard that required that "ground disturbing activities will be surveyed for TEP species". Chapter III of each of the Forest Plans has two main areas that increase protection, conservation, and management direction significantly from the previous plans. The first major area of improved Forest-wide direction is the TEPC section, which outlines very specific protection and management requirements for TEPC plant species. This section is designed to protect "occupied" habitat of TEPC plants and will ensure that adequate protection is in place if new populations of TEPC plant species are located within the Ecogroup. Additionally, the management direction is written to anticipate the dynamic nature of the 90-day species lists provided by US FWS. If new TEPC species (not currently analyzed or presented here) are found within the Ecogroup, the Forests will have sufficient management direction to protect these species as well. The second major area of improved Forest-wide direction is the Botanical Resources section (Chapter III – Forest Plans). Goals, objectives, standards, and guideline (major themes presented above in the Forest Plan Direction and Implementation section) provide much improved direction for surveys, habitat protection, noxious weed prevention, pollination, adverse affects, and research direction. The substantial change in management direction for botanical resources in the revised plan greatly improves TEPC, sensitive, and watch species protection and conservation.

Additionally, management area specific standards, guidelines, goal, and objectives have been defined for specific species. Each management area has a characterization that provides information about the TEPCS or watch species that are known to occur there and their habitat descriptions. Additionally, guidelines promote the need to maintain or restore habitats of sensitive species. Standards are written to ensure that specific Conservation Agreements and Strategies will be implemented and that projects will meet the requirements of the agreements and strategies.

Rare and Unique Communities

The rare and unique communities found in the Ecogroup are listed in Appendix G, Table G-6. However, the actual spatial locations and numbers of occurrences of these communities are unknown in many cases. Forest-wide guidelines specifically state that globally rare plant communities should be surveyed and mapped, and this information will be coordinated with the ICDC (Botanical Resources section, Chapter III, revised Forest Plans). In addition, guidelines state that Botanical Special Interest Areas should be identified and recommended for establishment; and these areas may include rare plant communities. Therefore, the process of locating these rare and unique communities is ongoing. Sixteen of the identified rare and unique communities are already present in RNAs, which afford a high level of protection. Other communities are riparian types, which would fall into RCAs or RHCAs, where any activities proposed must be designed to either maintain current conditions or to achieve desired conditions for riparian and aquatic resources. Activities that would benefit riparian resources over the long-term would also likely benefit rare riparian communities.

Potential Habitat

Desired conditions for the Forest will provide for a mix of seral stages, based on HRV for each type, again providing for the variation across the landscape that would have existed historically. This coarse filter approach should help maintain or restore potential habitat that may exist for TEPCS or rare plants that are as yet unsurveyed. Additional protection for vegetation is provided by the standards and guidelines at both the Forest-wide and Management Area levels (Chapter III, revised Forest Plans), by the State of Idaho Best Management Practices, and by Forest Service Manual and Handbook direction.

Non-native Plants

INTRODUCTION

Non-native plants are species that do not have their origin in a local area. They have not adapted to or evolved with the local environment, including native plants, animals, and disturbances. Non-native plants include exotics and noxious weeds. Exotic plants are species that have been introduced to an area, usually from a different continent. Noxious weeds are plant species designated by law that can have detrimental effects on agriculture, commerce, or public health. They spread aggressively and are difficult to manage. These species are generally new or not common to the United States. Noxious weeds present the most immediate and disruptive threat to ecosystem function of the non-native plants present on the three Forests. For this reason, the non-native plant discussion will focus primarily on noxious weeds. Portions of the woodlands, *Vegetation Diversity* section in this chapter address exotic and non-native plant issues and need for change related to vegetative diversity and properly functioning condition.

Noxious weed and exotic plant species are spreading rapidly locally, regionally, and nationally. Roads, trails, and rivers have been identified as primary conduits for noxious weed and exotic plant transport and establishment. This rapid rate of weed expansion is partly due to the lack of natural control agents in new environments, prolific seed production, physiological advantages over other plants, and a strong ability to establish in various vegetative successional stages and communities. Some landscapes are more susceptible to invasion than others, due to productivity of sites and the similarity of environmental conditions from where the plant originated. This susceptibility can affect rate of spread and the extent or size of infestations.

Noxious weeds that are classified as invaders pose the greatest threat. These plants are capable of becoming established in pristine or relatively undisturbed areas and can spread quickly over large geographical areas. Spotted knapweed, diffuse knapweed, yellow starthistle, leafy spurge, and dyers woad are good examples of invaders. These infestations can substantially change overall biological diversity by affecting the amount and distribution of native plants and animals. They can also have negative effects on recreational experiences, forest regeneration, wildlife and livestock forage, native plant resources associated with tribal rights, landscape and soil productivity, fire cycles, nitrogen cycling, riparian and hydrologic function, and water quality.

Issues and Indicators

Issue Statement - Forest Plan management strategies have the potential to influence non-native plant establishment, spread, detection, and control.

Background to Issue – A Need For Change related to non-native plant management was identified in the *Preliminary AMS for the Southwest Idaho Ecogroup* (USDA Forest Service 1997). There is a need to modify current management direction to adequately address non-native plants and their effects on ecosystem structure, composition, and function. Due to the expansion of noxious weeds, the presence of previously established exotics, and the introduction of non-native vegetative species within the three Forests, ecosystem structure, composition, and function are at risk. These non-native plants have greatly increased from historic conditions. Exotic plants have been identified as one of the causative factors contributing to changed conditions on the landscape (ICBEMP 2000a). For example, new information contained in the Interior Columbia Basin Ecosystem Management Project (ICBEMP) and additional research (Lacey et al. 1989) have linked noxious weed invasion with the potential decline in long-term soil productivity and soil-hydrologic function and processes. Specific needs are to provide consistent management standards and guidelines for permits, special use authorizations, contracts, and Forest Service administrative activities that prevent the further spread and establishment of noxious weeds. Also needed is a prevention/ containment/control strategy that recognizes the difficulty and expense of controlling large and firmly established populations of noxious weeds and exotics. The strategy would be based on factors that favor and contribute to the establishment and spread of noxious weeds.

Management direction that recognizes jurisdictional boundaries, landownership patterns, all functional resource areas, and the appropriate levels of scale for noxious weed and exotic plant management is also needed. Idaho has finalized a state strategic plan for managing noxious weeds. The purpose of the strategic plan is two fold: 1) to heighten the awareness among all citizens of the degradation brought to Idaho lands and waters by the explosive spread of non-native weeds and, 2) to bring about greater statewide coordination, cooperation, prioritization, and action that will successfully halt the spread of such weeds and restore infested lands and waters to a healthy and productive condition. The Strategic Plan recommends the statewide formation of *Cooperative Weed Management Areas* and application of *Integrated Weed Management* prevention and control measures. Such a coordinated effort is operating within the Payette River Weed Management Area, established with a Memorandum of Understanding in 1998. Similar opportunities for coordination exist within the three Forests, particularly within the large river corridors and basins.

Initial public scoping on noxious weeds did not generate much comment. However, one pertinent comment identified the need to identify specific sources that spread noxious weeds in order to better address and treat specific causes of spread**.**

A few pertinent comments were identified from the Draft FC-RONR Wilderness EIS relating to noxious weeds. While this EIS addresses a separate action from the Ecogroup Forest Plan Revision effort, the comments are relevant due to the 1) overlapping shareholders, 2) proximity of the wilderness to or on the three Forests, 3) shared river corridors, 4) overlapping timing of the two projects, and 5) similar nature of noxious weed infestations in the two project areas. The comments generally demonstrated a high level of awareness that the noxious weed problem was a threat to the environment. While some wanted more passive methods of treatment, two-thirds of the comments indicated support for implementing an aggressive noxious weed control program that included herbicide use. Several comments stressed that control actions needed to occur now, without further delay, and some of those encouraged action without further planning.

Internal Forest Service comments were similar. While there was general agreement with the need to identify factors contributing to the spread and establishment of noxious weeds, employees also felt that noxious weed prevention and management needed to become more multi-functional in direction and implementation. An additional concern dealt with the ineffectiveness of weed management across jurisdictional boundaries and adjacent land ownerships.

While these comments are all valid concerns, they are components of the much larger issue, presented in the issue statement concerning the Forests' ability to implement Integrated Weed Management on a long-term basis. To a large degree, the ability to address these concerns is dependent upon budgets, annual priorities, and the implementation level of resource integration. However, some variables will likely change by alternative emphasis.

Indicators - The following indicators will be used to measure the effects of noxious weeds as a surrogate for non-native plants on the three Forests, by alternative.

- *Estimated total acres of high susceptibility to noxious weed invasion within Management Prescription Categories that have a high exposure to invasion risk, moderate to high detection, and high ability to treat* – This indicator attempts to reflect three aspects of management that contribute to the effectiveness of Integrated Weed Management and will vary according to Management Prescription Category assignment. They are: 1) the level or types of travel access changes (roads and trails) and management that present risks for new weed population establishment; 2) the relative ability for new noxious weed populations to be detected by the Forest Service or the public; 3) and the relative ability and range of flexibility (funding and tools available) to treat established weed populations. As a result, Forest-wide management effectiveness will depend on recognizing the program implications of management changes and emphasis.

- *Estimated total acres of high susceptibility to noxious weed invasion within Management Prescription Categories that have a low to moderate exposure to invasion risk, low detection, and a low to moderate ability to treat* – Same as the indicator just above.

- *Estimated total noxious weed acres by Forest during the short term* - This indicator reflects the effectiveness of Integrated Weed Management, based upon certain assumptions associated about key noxious weeds species and likely effects from different activities.

- *Effects within fire regimes/PVGs that have most departed from historical conditions* – See also the *Vegetation Hazard* section for more information. These effects show the potential risk of exotic plant spread into areas that are not currently considered highly susceptible, if uncharacteristic wildland fire and stand-replacing events occur.

Affected Area

The affected areas for direct and indirect effects of noxious weeds are lands administered by the three National Forests in the Ecogroup. Some management areas may be highlighted in discussions, due to the significance of their contributions to Forest-wide effects. This affected area represents lands where noxious weeds or exotic plants exist and could expand into, and lands where these plants could establish due to the effects of Forest management activities, environmental conditions, and natural events.

The affected area for cumulative effects includes the lands administered by the three National Forests, and lands of other ownership both within and adjacent to these National Forest boundaries. The cumulative effects are also addressed at the Interior Columbia River Basin Ecological Reporting Unit level (see *Vegetation Diversity* section). This expanded area is necessary to show the relationship between Forest and off-Forest effects from noxious weeds and exotic plants, and to emphasize the need for coordination of non-native plant management among adjacent land owners. Although data may be limited on non-Forest System lands, the spread of exotic plants across jurisdictional boundaries can be described to identify potential cumulative effects to Ecological Reporting Units that were defined by the Interior Columbia Basin Ecosystem Assessment (ICBEMP 1997c). The Central Idaho Mountains ERU contains most (87 percent) of the Southwest Idaho Ecogroup, while small portions of the Upper Snake River and Owyhee Uplands ERUs overlay the southern divisions of the Sawtooth National Forest.

CURRENT CONDITIONS

Known Species and Infestations

Noxious weeds and exotic plants pose a serious threat to the diversity, integrity, and health of plant communities on all three Forests. There are numerous species of noxious weeds present on the Forests (see Table N-1 for known species and presence by Forest).

Table N-1. Known Noxious Weed Presence by Forest

Common Name	Scientific Name	Boise	Payette	Sawtooth
Canada thistle	*Cirsium arvense*	X	X	X
Spotted knapweed	*Centaurea maculosa*	X	X	X
Leafy spurge	*Euphorbia esula*	X	X	X
Yellow starthistle	*Centaurea solstitialis*		X*	
Rush skeletonweed	*Chondrilla juncea*	X	X	
Diffuse knapweed	*Centaurea diffusa*	X		X
Orange hawkweed	*Hieracium aurantiacum*	X		
Yellow toadflax	*Linaria vulgaris*	X	X	X
Dalmatian toadflax	*Linaria dalmatica*	X	X	X
Scotch thistle	*Onopordum acanthium*	X	X	X
Purple loosestrife	*Lythrum salicaria*	X*		
Dyers woad	*Isatis tinctoria*	X*	X	X*
Musk thistle	*Carduus nutans*	X	X	X
Hoary cress	*Cardaria ssp.*	X	X	X
Common St. Johnswort	*Hypericum perforatum*	X	X	
Black henbane	*Hyoscyamus niger*			X
Field bindweed	*Convolvulus arvensis*	X		X

*Population eradicated, may no longer exist on Forest

Ranger districts on all three Forests are continually updating their inventories of noxious weed infestations on an ongoing basis. As of 2001, the Forests have identified 17 species (Table N-1) and 47,394 acres of noxious weed infestations (see Table N-2 for breakdown by Forest and species). The South Fork of the Boise River, the South Fork of the Payette River, upper portions of the Salmon River, and the Big Wood River drainages have the largest acreages of infestations.

Table N-2. Noxious Weed Acres by Forest

Common Name	Boise	Payette	Sawtooth
Canada thistle	13*	525**	128
Spotted knapweed	1,407	237	2,491
Leafy spurge	662**	1	6,016**
Rush skeletonweed	31,657**	11	0
Diffuse knapweed	13	10	27
Yellow toadflax	2	5	1,206
Dalmatian toadflax	1,214	262**	310
Scotch thistle	35	604	33
Musk thistle	92	0	7
Hoary cress	2	32	15
Common St. Johnswort	305	35	0
Other Species	1	3	33
Total Acreage	**35,403**	**1,725**	**10,266**

*Emmett RD acreages are not available at this time.
**These numbers have been updated from the Draft EIS

The three Forests have environmental conditions very similar to landscapes from where several noxious weed species have originated, and this affects rate of expansion and establishment. Five noxious weed species (listed in Tables N-4 through N-6) have been selected to represent site susceptibility to invasion within the Ecogroup area. Dalmatian and yellow toadflax were initially considered, but not selected. Selection of the species analyzed for susceptibility was based upon one or more of the following criteria:

- The species present a significant management challenge due to physiological advantages and resistance to control - rush skeletonweed and leafy spurge (Karl et al. 1996).
- The species are present at relatively low levels, but are significant invasion risks due to historic rates of expansion, ability to invade undisturbed sites, and known scientific information - spotted and diffuse knapweed (Asher and Harmon 1994, Tyser and Key 1988, Harris 1991).
- The species have limited bio-agent availability and lack effective methods for control – rush skeletonweed (Karl et al. 1996).

- The species are not present on Forest now, but are in close proximity and spreading regionally at alarming rates - dyers woad, and yellow starthistle (Dewey et al. 1991, Roche 1994).

- The species are precursors to more pervasive noxious weeds – diffuse and spotted knapweeds.

The Interior Columbia Basin Ecosystem Assessment identified lands that were highly susceptible to noxious weed invasion for 25 species (ICBEMP 2000a). The susceptibility ratings were based on vegetation cover types and precipitation zones that have a high frequency of invasion and presence. Table N-3 identifies the percent of susceptible areas within Ecological Reporting Units that contain the Ecogroup Forests for five noxious weed species. Based upon this assessment, only a relatively small percentage (3-17) of BLM and Forest Service lands are highly susceptible to invasion. The Central Idaho Mountains ERU, which contains a majority of the Ecogroup's land base, appears to have the greatest overall susceptibility for the five species.

Table N-3. Percent of ERUs Highly Susceptible to Invasion by Species

Noxious Weed Species	Central Idaho Mtns ERU		Upper Snake River ERU		Owyhee Uplands ERU	
	All Lands	BLM-FS	All Lands	BLM-FS	All Lands	BLM-FS
Leafy Spurge	14	8	40	6	15	3
Spotted Knapweed	22	17	25	9	6	4
Diffuse Knapweed	18	17	8	10	5	5
Yellow Starthistle	11	7	29	14	6	4
Rush Skeletonweed	N/A	N/A	N/A	N/A	N/A	N/A

N/A = Information not available in the ICBEMP documents.

Further refinement of the noxious weed susceptibility evaluation was conducted during the revision process. Tables N-4, N-5, and N-6 display the acres of lands by Forest that are highly susceptible to invasion by noxious weed species. These numbers indicate that the three Forests have a greater susceptibility to invasion than was predicted at the Interior Columbia River Basin Assessment level. Comparing the numbers in Table N-2 to the acres susceptible to invasion (Tables N-4, N-5, and N-6) reveals the potential for rapid short-term expansion and long-term effects to other resources. The Big Wood, Middle South Fork Boise River (Sawtooth NF); Lower South Fork Boise River, Boise Front/Bogus Basin, Middle Fork Boise River (Boise NF); FC-RONR Wilderness, and Weiser River (Payette NF) Management Areas are the most susceptible to noxious weed invasion (see Non-native Technical Report #1). While these numbers may not be all-inclusive, they do indicate the magnitude of the noxious weed problem and the significant potential of spread. Specific and potentially significant vectors of establishment and spread are described below.

Vectors of Non-Native Plant Establishment and Spread

Roads

Most existing infestations are along or have originated from roadsides, because vehicle traffic provides ideal means for noxious weed spread. Roads and their associated vehicle traffic are the largest contributors to noxious weed expansion and pose the most difficult challenge to manage within the Ecogroup. An estimated 77 percent of the inventoried infestations are along or have originated from roadsides. Large-scale examples include: Dalmatian and yellow toadflax along State Highways 21 and 52 in the South Fork Payette River and Highway 75 along the Salmon River; rush skeletonweed along State Highways 52 and 21 between Banks and Grandjean; leafy spurge along the road systems in the South Fork Boise River corridor; and spotted and diffuse knapweed in the Big Wood River drainage adjacent to State Highway 75 and Forest Service system roads surrounding Ketchum.

Table N-4. Boise NF Acres Highly Susceptible to Invasion by Species

Noxious Weed Species	Acres Highly Susceptible to Invasion	Percent of Total Forest Acres
Leafy Spurge	858,719	33.8
Spotted Knapweed	490,121	19.3
Diffuse Knapweed	124,618	4.9
Yellow Starthistle	63,434	2.5
Rush Skeletonweed	982,237	38.6
Totals (one or more species)	**1,175,034**	**46.0**

Table N-5. Payette NF Acres Highly Susceptible to Invasion by Species

Noxious Weed Species	Acres Highly Susceptible to Invasion	Percent of Total Forest Acres
Leafy Spurge	260,826	10.9
Spotted Knapweed	156,741	6.5
Diffuse Knapweed	45,356	1.9
Yellow Starthistle	29,882	1.2
Rush Skeletonweed	381,451	18.9
Totals (one or more species)	**495,929**	**21.0**

Table N-6. Sawtooth NF Acres Highly Susceptible to Invasion by Species

Noxious Weed Species	Acres Highly Susceptible to Invasion	Percent of Total Forest Acres
Leafy Spurge	68,599	3.1
Spotted Knapweed	288,382	13.2
Diffuse Knapweed	100,587	4.6
Yellow Starthistle	8,003	0.4
Rush Skeletonweed	89,984	4.1
Totals (one or more species)	**391,067**	**18**

Most existing infestations are along, or originated from, roadsides, because vehicle traffic and road maintenance provide ideal means for noxious weed spread. Roads, trails, and rivers have also been identified as primary conduits in other areas for noxious weed and exotic plant transport and establishment (ICBEMP 1997b, Forcella and Harvey 1983, Gelbard and Belnap 2003, Watson and Renney 1974, Mass 1985, Westbrooks 1998, Cole and Landres 1996). Roads and their associated vehicle traffic are the largest contributor to noxious weed expansion within the Ecogroup area. Seventy seven percent of inventoried infestations are along or have originated from roadsides. Some of the denser infestations are near roads, which can enhance the likelihood of spread (see Non-native Technical Report #1).

Currently, there are an estimated 14,746 miles of classified and unclassified forest, county, state, and federal roads and highways on the Forests (Table N-7). The miles of roads listed in Table N-7 are generated from the three Forests' GIS database. These numbers are not the same as those listed in Table RO-1, as Table RO-1 only included classified roads. All roads are included in this analysis as an indicator to display potential for non-native plant establishment and spread.

Lower South Fork Boise River, Mores Creek, and North Fork Boise River Management Areas on the Boise National Forest; Snake River and Weiser River Management Areas on the Payette National Forest; and Big Wood River, Trapper Creek/Goose Creek, and Raft River Management Areas on the Sawtooth have some of the highest numbers of roads on the Forests (see *Soils, Water, Riparian, and Aquatic Resources* section in this chapter). Table N-7 displays the miles and percent of roads and highways within areas of high susceptibility to invasion by certain species and by Forest. Transportation of weed seed by contractor or special use vehicles or equipment is to a certain degree being managed to reduce the risk of new infestations. Use of roads by the general public presents the greater risk, due to the lack of control measures and knowledge about noxious weed spread.

Table N-7. Miles and Percent of Roads within Areas of High Susceptibility

Forest	Total Miles of Roads	Miles of Roads within Susceptible Areas	Percent of Roads within Susceptible Areas
Boise	6,356	3,702	58
Payette	5,550	1,117	20
Sawtooth	2,840	893	31
Totals	**14,746**	**5,712**	**39**

Recreation Areas and Use

Motorized and non-motorized recreation activities are likely the second most common vector of weed seed transport and establishment. This is due to the minimal control over allowing weed-free vehicles to travel Forest roads and trails. Frequently, initial infestations for noxious weeds and exotic plants occur in conjunction with trailheads, trails, campgrounds, and other developed recreation sites. Trails and sites in drainages of the South Fork Boise River, Big Wood River, South Fork Payette River, portions of the North Fork Payette River, and segments of the main Salmon River present the most significant concentrations of development use that overlap areas of high susceptibility. Currently there are 2,591 miles of motorized trails, 2,270 miles of non-motorized trails, and 427 developed campgrounds/recreation sites (Table N-8). An estimated 29 percent of the motorized trails are within areas of high susceptibility, while 20 percent of the non-motorized trails are in these areas. An estimated 28 percent of the developed sites are within areas of high susceptibility. An estimated 4.5 million summer Recreation Visitor Days occur on the combined Forests (Table N-9). Table N-8 displays the number of sites and trailheads within areas highly susceptible to invasion by species and Forest. River recreation corridors also have a large number of infestations occurring within them.

Table N-8. Recreation Use Areas and High Noxious Weed Susceptibility

Recreation Use Areas	Boise NF		Payette NF		Sawtooth NF	
	Forest Wide Total	Within High Susceptibility Areas	Forest Wide Total	Within High Susceptibility Areas	Forest Wide Total	Within High Susceptibility Areas
Miles of Motorized Trails	881	313	622	121	1,088	162
Miles of Non-motorized Trails	218	48	1,153	302	899	195
Acres Open to Motorized Travel*	524,000	183,623	509,000	105,484	787,000	208,141
Developed Recreation Sites	207	30	79	20	141	59

*Acres open to summer motorized use.

Table N-9. Forest Recreation Use

Recreation Use Criteria	Boise NF	Payette NF	Sawtooth NF	Totals
Developed Recreation Site PAOTs*	11,041	3,664	12,387	**27,092**
Summer Recreation Visitor Days (estimate for year 2000)	1,586,000	1,126,000	1,826,000	**4,538,000**

*Does not include developed ski areas.

Timber Harvest and Fire

Ground-disturbing activities, equipment transport and use associated with timber harvesting, road construction, road maintenance, fire suppression, or other authorized uses are other common sources influencing the expansion of noxious weeds and exotic plants. Most of these risks are being minimized with localized site restoration and rehabilitation. Opening of forested canopies in the drier forest vegetation groups (PVGs 1, 2, 4, and 5) with either fire or mechanical means can also influence the establishment and growth of new infestations. This group of activities is dependent on seed sources in the area or seed transported in from another area.

Table N-10 displays the acres of PVG 2 and 5, the acres of tentatively suited timber, and the highly susceptible acres to invasion. About half of the Ecogroup's tentatively suited PVGs 2 and 5 are in areas of high susceptibility. This amount also represents 22 percent of the Ecogroup's total acreage of high susceptibility. Several studies in the western United States demonstrate that weeds frequently invade and dominate plant communities following fire, sometimes on a large scale (Asher et al. 1999). Most of these risks can be minimized with localized site restoration and rehabilitation. Effectiveness is usually dependent on seed sources in the area or seed transported in from another area.

Table N-10. Susceptibility to Weed Invasion Within PVGs 2 and 5 by Forest

Forest	Potential Vegetation Groups (PVGs) 2 & 5	Tentatively Suited Lands in PVGs 2 & 5		Tentatively Suited, in PVG 2 & 5 w/ High Susceptibility to Noxious Weeds		
	Acres	Acres	Percent of PVGs 2 & 5	Acres	Percent of PVGs 2 & 5	Percent with High Sus-ceptibility
Boise	451,840	438,986	97	325,198	72	28
Payette	469,311	315,647	67	135,720	29	27
Sawtooth	11,027	7,836	71	7,348	67	2
Totals	**932,178**	**762,469**	**82**	**468,266**	**50**	**22**

Livestock Grazing

Noxious weed expansion may also occur to a lesser degree in the Ecogroup area with the transport of seed by livestock from infested areas. Only 25 percent of the three National Forests are considered capable rangeland, and 36 percent of the Forests do not contain allotments (see

Rangeland Resources Technical Report #3). Table N-11 displays the relationships between capable rangeland and noxious weed susceptiblity. The Boise National Forest has the greatest percentage of overlapping condition among the three Forests. While the Sawtooth Forest has the greatest amount of capable rangeland, it has only a moderate overlap.

Table N-11 Capable Rangeland Susceptible to Weed Invasion

Forest	Capable Rangeland	Acres Highly Susceptible to Noxious Weed Invasion	Capable Rangeland Highly Susceptible to Noxious Weed Invasion		
			Acres	Percent of Capable Rangeland	Percent Highly Susceptible
Boise	643,949	1,175,034	300,334	46	26
Payette	363,698	495,929	42,473	12	9
Sawtooth	683,299	391,067	177,062	26	45
Totals	**1,690,946**	**2,062,030**	**519,869**	**25**	**25**

It has been documented that seeds can be spread through livestock feces, fleeces, and hooves (Belsky and Gelbard 2000, Callihan et al. 1991). Many can pass through the digestive system and still retain their germination ability (Messersmith 1989, Belsky and Gelbard 2000). In addition to livestock, native grazers such as mule deer, bighorn sheep and elk, and some birds such as mourning doves, can perform this same role of seed spread. However, grazing of domestic livestock has shown to be an effective method in managing large infestations while assisting the ecological succession process (Goodwin et al. 2002, Asher et al. 1999).

Localized areas where excessive grazing duration and use contributes to reduced ground cover and early successional stages can become potentially susceptible to weed or exotic plant establishment. Plant communities with low average plant cover and frequent disturbance are most at risk to invasion (Beck 1998). This is consistent with findings in the Interior Columbia River Basin Assessment, as the dry shrub and perennial grasslands have seen the greatest change (See Non-forested Vegetation Technical Report), display higher vulnerability to exotics (ICBEMP 1997c), and typically have lower plant cover. The Ecogroup area has a trace amount of dry shrub (Wyoming big sagebrush). Livestock grazing has not been identified as a significant contributor to the broad-scale spread of noxious weeds in less arid or mesic areas (Stohlgren 1999). Except for a few situations within the Ecogroup, ranger district personnel have not identified livestock as significant contributors to the spread of exotics and noxious weeds.

A recent review of other publications (Belsky and Gelbard 2000) argues that livestock grazing, trampling, and seed transport have significantly increased the invasion of non-indigenous plants in arid and semi-arid areas. Most of this discussion focuses on arid environments and cheatgrass. Most of the examples given where recoveries have occurred when livestock were removed are in riparian areas and mesic to moist sites. However, a number of other studies have found that removal of livestock or disturbance does not necessarily decrease the amount of exotics (Brandt and Rickard 1994, Daubenmire 1975, Rice and Westoby 1978, Robertson 1971, West et al. 1984) or improve conditions on warm, dry sites. In addition, some weed species have been found to invade undisturbed (not grazed) grasslands and shrublands (Enserink 1999, Harris 1991, Kleiner and Harper 1971, Lacey 1987, Lacey et al. 1990, Tyser and Key 1988, Bedunah 1992, Randall 1993a & b). The species identified as being invaders to undisturbed grasslands and shrublands in these references (leafy spurge, spotted knapweed, and diffuse knapweed) are three of the five species that are of great concern within the Ecogroup. Although it is not addressed to the extent of the mentioned species, rush skeletonweed is another exotic that has effectively invaded sites currently ungrazed by livestock within the three Forests.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Noxious weed management has been integrated into multiple scales of direction, from national to site-specific. The cumulative effect of the multi-dimensional direction described below is beneficial in the prevention, containment, and control of noxious weed species.

Laws, Regulations, and Policies – Numerous federal and state laws, regulations, executive orders and policies govern Integrated Weed Management on National Forest administered lands. Some of the more important ones relating to the use of Integrated Weed Management (IWM), the determination of factors favoring the establishment and spread of noxious weeds, and the design of prescriptions that reduce the risks, the detection and response of invasive species, accuracy and reliability monitoring are described in Appendix H, Legal and Administrative Framework. National laws and regulations have also been interpreted for implementation in Forest Service Manuals, Handbooks, and Regional Guides. Noxious weed management activities associated with Integrated Weed Management must comply with these laws, regulations, executive orders, and policies, which are intended to provide general guidance for the implementation of weed management practices, and for the protection of other potentially affected resources.

Forest Plan Direction – Although Forest Plan noxious weed management direction and emphasis would vary somewhat by alternative, direction for all alternatives is to eradicate, prevent, control, and contain noxious weed populations on National Forest administered lands. Direction occurs at both the Forest-wide and Management Area levels. Non-native plant goals and objectives have been designed to achieve desired vegetative conditions over the long term, and to maintain or restore land productivity and ecosystem functions and processes. Goals and Objectives at the Forest-wide and Management Area levels also provide the framework for how Integrated Weed Management will be conducted. Management Area direction highlights key species for short-term strategy emphasis (either prevent, contain, control, or eradicate). Standards and guidelines for noxious weed and exotic plants are established for the primary purpose of preventing new infestations, and retarding or containing existing infestations on the three Forests. A variety of methods are used as management direction components to minimize or reduce the direct effects of noxious weeds on other resources. However, the degree each of these will be used in each forest plan alternative is dependent on the management activities and uses emphasized. All the alternatives will include the following management components:

- Establish Management Area's susceptibility to invasion and direction for site-specific project planning and implementation.
- Provide guidelines for transportation system management and development.
- Establish Forest-wide standards for land and resource administration and use to prevent the spread of non-native plants.
- Secure restrictive covenants or standards and/or other protective measures for specific areas.
- Provide a list of Best Management Practices or guidelines for use and application in project-level designs.

Forest Plan Implementation – Most aspects of Integrated Weed Management depend on local coordination and site-specific information that can change on a yearly basis. Responsibilities associated with site-specific noxious weed management and administration will not change by Forest Plan alternative, as this is determined by existing policy (FS Manual 2100, Environmental Management) and annual budget priorities. Specific project designs are dependent on the action's relation to existing noxious weed infestations, the expected level of land disturbance, timing of projects, the land's susceptibility to invasion, and locally prescribed methods for rehabilitation. These are not easily addressed at the programmatic level. However, the district planning process can and will address these factors at the project area scale. Through this process, which is the same for all alternatives, adjustments in noxious weed management practices would be made to address resource concerns in a timely, effective, and site-specific manner that involves the Forest Service and the public in land management actions. Some of the actions include:

- Establish cooperative noxious weed management areas that work to reduce potential introductions and spread from all ownerships and jurisdictions.
- Treating infestations with various chemical, mechanical, livestock grazing, or biological methods.
- Providing interpretative displays and activities.
- Initiating public education programs.
- Posting areas of infestations with informational signs.
- Properly designing projects to minimize the spread or establishment of infestations.
- Ensuring ground cover restoration or rehabilitation.
- Increasing monitoring and law enforcement.

<u>General Effects Common to All Alternatives</u>

An Integrated Weed Management strategy will be a part of all Management Prescription Categories (MPCs) and alternatives. Noxious weed populations will be monitored to plan annual and long-term treatment strategies. Integrated Weed management on the three Forests will continue to emphasize prevention and eradication of new infestations. A variety of methods will be available to prevent the establishment of noxious weeds, such as:

- Establishing landscape levels of susceptibility to invasion and preventive direction for site-specific projects;
- Providing guidelines for transportation system management and development;
- Establishing Forest-wide standards for land and resource administration and use;

- Securing restrictive covenants and/or other protective measures for specific areas; and
- Providing a list of prevention and control measures for use and application in project-level designs.

However, because weeds can spread so many different ways, 100 percent prevention is not feasible or cost effective (Kummerow 1992, Petroff 1994). Thus, eradication, control and containment become necessary. Treatment of weed-infested areas will include the use of cultural, mechanical, biological, and chemical control agents as described in each Forest's environmental assessment on the management of undesirable plant species. It is often suggested that non-native plants need to be eradicated when they replace native species or eliminate their habitat. But the strong persistence of non-native plants, and their high eradication costs suggest that philosophical, social, and practical dimensions need to be incorporated along with ecological considerations (Cole and Landres 1996) when developing treatment programs. Therefore, some form of area prioritization (Petroff 1994) should occur, in order to provide consistency of treatment and management when funding is limited, and to ensure certain landscapes with important resource values are restored or protected.

Noxious weed establishment will continue to occur. This assumption is based on the high rates of spread expected under natural conditions, the persistence of viable seed over several years, and our historic inability to slow or reduce noxious weed populations consistently over a long time period. Once key weed species are established, particularly on areas of high susceptibility, they will crowd out native plants, displace wildlife species, degrade foraging conditions on historic winter ranges for ungulates, increase the frequency and damaging effects of fire, increase sediment transport and erosion, and disrupt watershed function and nutrient and energy flow. Left unmanaged, noxious weeds and non-native plants will pose a significant threat to ecosystem health and integrity. Infestations of weeds will continue to exist on all three Forests at various densities and population sizes.

Like native plant species, noxious weeds will grow and spread where favorable environmental conditions for their establishment occur. Many of the species that pose threats to the Ecogroup originate from regions of the world where climatic conditions are similar to parts of southwestern Idaho. Specific portions of the landscape will provide even more favorable environmental conditions than others. These sites are dependent on such attributes as precipitation, temperature, elevation, aspect, soils, vegetative cover types, and canopy closure. The greatest proliferation and increases in density will occur on these sites. As a result, they have been classified as areas of high susceptibility to invasion. These sites will not change by alternative, because the environmental conditions are expected to remain the same. These areas will be affected by the early to mid stages of regional-scale invasion.

Non-native plants affect terrestrial and aquatic communities primarily with their physical presence and ability to compete with other vegetation. This presence influences different components of the Ecogroup Ecosystem Management framework (see Chapter 3, *Introduction*) in neutral or negative ways. The effects to ecosystem elements can be classified as either direct or indirect:

- **Non-native plant establishment can directly alter** the amount of annual and perennial vegetation present (biological); the percent of soil ground cover (physical); and the quality of terrestrial wildlife cover (biological). These are common annual effects that occur during the short term.

- **Non-native plant establishment can indirectly alter** the vegetative species' composition of an area; shrub canopy closure patterns and distribution; individual plant vigor (biological); soil surface erosion rates, the level of sediment affecting water quality, the soil productivity of a site, water runoff volume or rate (physical); the quality of threatened and endangered species habitat (biological); aquatic and terrestrial habitat condition (biological); fire regimes (physical); big game winter range (biological); the level of shrub and tree regeneration (biological); the level of individual and community net income (economic). Indirect effects will become more apparent in the latter portions of the short-term period and extend into the long term. These effects will become most apparent after 10 to 15 years of infestation.

The effects of integrated weed management are largely dependent upon the implementation effectiveness of detection, prevention, control, containment, and monitoring practices. Three considerations typically influence these weed management practices. They are: 1) the exposure risk to new weed infestation establishment, 2) the ability to detect and monitor weed populations, and 3) the relative ability to treat existing infestations.

The risk of exposure is affected by the level of activities that either transport seed or create potential sites for new seedlings to establish within an area. For example, the amount of vehicular traffic, recreation stock use, and other forms of dispersed recreation can affect the potential for seed dissemination risk. Also, soil or ground disturbance activities such as fire, construction projects, or ground-based logging activities can affect the number of potential sites for new seedlings to become established.

The ability to detect and monitor weed populations will influence the size and density of new weed populations. Detection is strongly connected to the frequency and amount of time various management activities take place in an area during the year, consistency among personnel to detect or document sites, and the amount of visitation by the general public. For example, in areas where other resource management activities are low and administrative visits are infrequent, the likelihood of detecting new populations is also low. If a new infestation becomes established, a couple of years could potentially pass without detection, thus creating a large weed seed source that would take several years to eliminate. For example, the Supplemental Draft Environmental Impact Statement for the Frank Church - River of No Return Wilderness gives an actual scenario where a new infestation expanded from 2 to 15 acres in three-year timeframe (USDA 1999).

The ability to treat established infestations is affected by the accessibility, financial flexibility, or treatment restrictions associated with an area. The degree of accessibility will influence treatment costs and the logistics of treatment. As result, the number of acres treated and the timing of treatments will be influenced. Also, effective treatment is dependent on application of chemicals, fire or other means during certain time windows. If not treated at the correct phenological stage, eradication or control effectiveness is reduced. In addition, the ability to finance treatments may be limited, given that some activities (e.g., timber harvest) and associated funding sources may not be allowed in certain areas. While recent years have seen an increase in the budget for the management of noxious weeds, the consistency of this funding is uncertain at best. Without consistent control or eradication efforts over a long duration, noxious weed expansion into susceptible habitats is a certainty.

The MPCs described in detail in Chapter 2 have been divided into two groups, based upon their response to the three considerations described above:

- **Prescriptions with a high exposure risk, moderate to high detection and high ability to treat** (MPCs 2.4, 3.2, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 8.0) - These MPCs would see a higher exposure risk due to the level of motorized vehicle use, the amount of roads, and types of recreation activities associated with these areas. Ground-disturbing activities are expected to be greater due to the amounts of fire, road reconstruction, site restoration, ground-based timber harvest, and dispersed recreation site uses. New infestations will likely be detected early, because administrative activities and public visitation will be higher. Infestations will likely have lower densities, due to the combination of frequent chemical and biological treatments. Accessibility to infestations will be easier, thus reducing cost, increasing the potential to treat more acreage and improve treatment timing. Interdisciplinary sources for funding integrated weed management will increase, due to the types and amount of use occurring in these areas. Management emphasis will take a balanced approach to prevention, containment, and control practices. Containment strategies will be more prevalent in order to maximize management effectiveness with available financing.

- **Prescriptions with a low to moderate exposure risk, low detection, and low to moderate ability to treat** (MPCs 1.1, 1.2, 2.1, 3.1, 4.1) - These MPCs would see a low to moderate exposure risk due to the level of non-motorized use, the low amount of roads, and types of recreation activities associated with these areas. Infestations will typically occur along travel corridors such as trails, primitive roads, and rivers. Ground-disturbing activities are expected to be minimal. This is due to the type of fire use, minimal site restoration, and the low level of ground-based timber harvest. New infestations will likely become larger and/or denser before treatment occurs. Resistance to control will likely be higher due to the amount seed produced from denser stands and the number of annual treatments needed. The duration of individual site treatments could potentially be longer. These results are due to less likelihood of early detection, since administrative activities and public visitation will be infrequent. Accessibility to infestations will be difficult, thus increasing cost and decreasing the potential to treat more acreage, with added potential to miss optimal treatment windows. Interdisciplinary sources for funding Integrated Weed Management will be less due to limited uses occurring in these areas. Typical management will emphasize prevention and early eradication. In the short term, containment practices will not be emphasized to the same degree as prevention and early eradication and control. Long-term risk of spread and potential impacts on ecosystem integrity will increase with the establishment of new infestations surrounding these areas and because detection and the ability to reduce infestation size and densities are inherently more difficult due to remote locations, a lowered ability to monitor on a regular basis, and the difficulty and cost of controlling denser stands.

Direct and Indirect Effects by Alternative

Susceptibility to Invasion

As discussed above, the MPCs have been sorted into two groups based upon exposure risk, detection, and ability to treat. The extent any one group will occur across the landscape varies by alternative. These alternative variations will directly affect the emphasis taken under Integrated Weed Management. The indirect outcome will ultimately translate into possible changes to the amount of infestation acres treated under containment or control strategies, the density of infestations, the distribution of the infestations, and how treatments occur. Table N-12 identifies the number of acres highly susceptible to invasion within prescriptions having a low to moderate exposure risk and low detection, and prescriptions having a high exposure risk and high detection and treatment.

Alternatives 4 and 6 show the least potential for short-term exposure and spread. However, due to new infestation expansion without detection, difficult treatment logistics, the proximity of existing weed infestations, and the potential for more extensive and hotter wildfires, the potential for long-term expansion and invasion is very high. The indirect results of these alternatives would also result in greater long-term potential risks to soil, water, riparian, and aquatic resources and less effective terrestrial habitat and big-game winter range. Once these elements are reduced, particularly soil productivity on the Idaho Batholith soils, the recovery time frames are long (>25 years).

Table N-12. Acres Susceptible to Invasion in Various Exposure Risk, Detection, and Treatment Groupings of MPCs

MPC Grouping	Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Low to moderate risk, low detection, low ability to treat	Boise	120,263	124,554	35,029	300,168	9,503	574,995	45,626
	Payette	302,549	309,524	251,278	384,975	219,041	396,851	303,468
	Sawtooth	63,288	58,702	20,014	123,253	9,726	268,379	24,262
	Totals	**486,100**	**492,780**	**306,321**	**808,396**	**238,270**	**1,240,225**	**373,356**
High risk, moderate to high detection, high ability to treat	Boise	818,417	814,126	903,651	638,512	929,177	363,685	893,054
	Payette	178,930	171,955	230,200	96,504	262,432	84,628	178,011
	Sawtooth	298,972	303,558	342,246	239,007	352,534	93,880	337,998
	Totals	**1,296,319**	**1,289,639**	**1,476,097**	**974,023**	**1,544,143**	**542,193**	**1,409,063**

Alternatives 3 and 7 have relatively high, short-term potential risks to these same resource elements. The extent of restoration planned under these alternatives is the primary reason this may occur. However, the long-term effects are likely to be less because of the amount of restoration activities planned during the short term, the larger potential of funding sources, and the expected positive vegetative and soil outcomes of restoration. Alternative 5 will likely have the greatest long-term potential for weed seed spread across the Ecogroup area, due to the greater likelihood of disturbed sites, the least amount of restricted travel access, and the anticipated regional population growth (See the Socio-Economic section of Chapter III in the FEIS).

The containment and control aspects of integrated weed management will likely be greater under Alternatives 5 and 1B. These alternatives also have higher short-term risks from the levels of commodity production and its associated disturbance. However, treatment of new infestations is likely to be more effective due to improved detection, monitoring, and logistics of treatment. The population densities of weed infestations are expected to be less under Alternatives 1B, 2, 3, 5, and 7 due to larger treatment programs, thereby reducing seed production potential.

Noxious Weed Spread

Infestations of weeds will continue to exist under all alternatives at various densities and population sizes. New noxious weed infestations will continue to occur on all three Forests. However, the extent of new sites and size of existing infestations will vary. This will depend upon the effectiveness of coordination between different resource disciplines and jurisdictional authorities, the spatial distribution of existing seed producing populations, the amount of highly susceptible habitat, the amount and type of disturbance, weed response to treatment, and the amount of seed transported to or retained in an area. Treatment of new or existing sites on a sustained basis will be one of the main determining factors of short- and long-term rates of spread and infestation size. Certain species will be more effectively controlled, due to the Forest population's size and the availability of treatment methods. Control is most probable with diffuse knapweed, yellow starthistle and possibly spotted knapweed in certain areas. Rush skeletonweed and leafy spurge will present formidable control and containment problems. Table N-13 identifies estimated annual broad-scale rates of spread for key Ecogroup weed species. These rates are used only as reference points for projecting potential Ecogroup spread, as they: 1) represent untreated infestations occurring under optimal growing conditions and sites; 2) do not reflect the effects of major disturbances, such as fire; and 3) do not include new infestation starts. The actual estimated rates will be based on broad assumptions about the alternatives displayed in Tables N-14 through 17.

Table N-13. Untreated Rates of Spread for Noxious Weed Species*

Species	Annual Rate of Spread (%)
Leafy spurge	12-50
Spotted knapweed	24-40
Diffuse knapweed	18-40
Yellow starthistle	6-17
Rush skeletonweed**	10-50

*Bureau of Land Management, USDI, 1985; White River NF, Draft Forest Plan EIS, 1999.
**USDA, 1999, Nez Perce, Bitterroot, Payette, Salmon-Challis NFs, FC-RONR SDEIS

Large portions of the South Fork Boise River, lower portions of the Middle and North Fork Boise River, Grimes Creek, Mores Creek, the South and Middle Fork of the Payette River, and the Hitt Mountains will contribute the most to leafy spurge rate of spread. This is due to the proximity of existing populations on and off Forest, the amount of high susceptibility sites, the amount of vehicle traffic, and the level of vegetation management. In these areas, minimal changes in vehicular traffic amounts and patterns under the different alternatives would result in minimal differences in the rate of spread for the alternatives. Spread will primarily be along river and stream corridors and accompanying road systems. Some expansion would occur in managed timber stands with open canopies. Spurge is difficult to treat and very persistent. As a result, rates of spread and spurge stand densities will be greater where logistics of treatment are difficult, and the options and financing to treat are less. This is the case with Alternatives 4 and 6 (Table N-14).

Table N-14. Estimated Leafy Spurge Expansion During the Short Term

Alternatives	Estimated Annual Rate of Spread	Estimated Acreage After Ten Years	Rationale for Alternative Grouping and Rates
1B, 2, 3, 5, and 7	8 - 15%	14,419 – 27,020	Most treatment options, but more open forest canopies.
4 and 6	10 - 20%	17,323 – 41,355	Less treatment options, denser weed stands. More difficult to logistically treat.

Spotted knapweed will expand the greatest amounts in the Big Wood River, South and Middle Fork Boise River, Grimes Creek, Mores Creek, South Fork of the Salmon River, Big Creek in the Frank Church River of No Return Wilderness, and the upper and lower portions of the main stem Salmon River drainages. Diffuse knapweed will expand in the Big and Little Wood River, the lower South Fork Boise River, the Boise Front, and Raft River Range. This is based on the amount of high susceptibility acreage and/or the number of existing populations documented by the districts in the areas. The South Fork of the Salmon River, Big Creek in the Frank Church River of No Return Wilderness present a greater risk because there are so few established infestations in these areas of high susceptibility. Spread will mostly be along river and stream corridors and arterial road systems. Although traffic patterns and amounts may change across the alternatives, spread due to road use will not vary to any large degree, due to the substantial proportion of infestations that occur along arterial roads.

Spotted knapweed has the widest Ecogroup distribution, yet remains in relatively small pockets of relatively small infestations. Of all the species, spotted knapweed will be influenced by vegetation management activities and practices the most. Opening canopies in forested PVGs 1, 2, 4, and 5 using timber harvesting or fire, late-season grazing and trailing in existing infestations, mechanized recreation use in late summer and early fall, and all types of trail use will contribute to the spread of knapweed. Alternatives 1B, 3, 5 and 7 would see the greatest expansion of knapweed populations due to these factors. However, densities will likely remain low due to weed treatment actions. Alternative 3 is in this high category, primarily because of the amount of management activity planned in the short term. If the activities and practices implemented under Alternative 3 and 7 do not contribute to further weed expansion, then the long-term rate of spread for these alternatives will be lower than Alternatives 4 and 6. The likelihood of increased populations occurring in the FC-RONR wilderness during the short term is relatively low, but the long-term expansion potential is high due to the location of existing populations, direction of spread, and expected population levels and densities surrounding the Wilderness to the east and north. Overall vegetation management activities will be lower under Alternatives 4 and 6, but the use of fire and spotted knapweed’s ability to invade undisturbed sites will still contribute to a slightly lower rate of spread.

Table N-15. Estimated Spotted and Diffuse Knapweed Expansion During the Short Term*

Alternatives	Estimated Annual Rate of Spread	Estimated Acreage After Ten Years	Rationale for Alternative Groupings and Rates
1B, 3, 5, and 7	10 - 25%	10,766 - 38,659	Open and dry forest types greater susceptibility, grazing seasons and duration of use, level of vehicle activity and motorized recreation use. Slightly higher road densities. Individual weed plant densities lower.
2, 4, and 6	5 - 15%	6,761 - 16,793	Prescribed wildfire and management ignited fire use. Moderate to high potential to invade undisturbed areas

*Diffuse and Spotted Knapweeds are combined due to their common responses to environmental influences, similar rates of spread, and control treatment effectiveness.

Yellow starthistle presents the least amount of spread potential of the five species, as its occurrence is still limited, and currently no populations exist on the three Forests. However, the lower South Fork Boise River, Arrowrock Reservoir, the lower main stem of the Salmon River, Hells Canyon, and Sage Hen Reservoir are at risk, since populations exist in Elmore, Idaho, Gem and Adams Counties.

Table N-16. Estimated Yellow Starthistle Expansion During the Short Term

Alternatives	Estimated Annual Rate of Spread	Estimated Acreage After Ten Years	Rationale for Alternative Groupings and Rates
1B, 3, 5, and 7	0 - 15%	0 - 20	Level of vehicle activity and motorized recreation use. Slightly higher road densities. More potential for physical disturbance in short term.
2, 4, 6	0 - 7%	0 - 9	Prescribed wildfire and management ignited fire use. Moderate potential to invade undisturbed areas.

Rush skeletonweed presents one of the greatest long-term risks to the entire Ecogroup. This is due to the sandy soil textures of the Idaho Batholith and the amount of high susceptibility habitat. Skeletonweed expansion during the next ten years will be greatest in the Boise River system, the South Fork Salmon River, Grimes Creek, Mores Creek, and the Middle Fork Salmon River. This can be attributed to the areas' proximity to the South Fork Payette River and road systems that connect the drainages. Populations in the South Fork Payette River would occupy most if not all the areas of high susceptibility in the drainage because of the current population size. Long-term expansion would likely occur into the Frank Church - River of No Return Wilderness and the Big Wood River. Big-game winter ranges in all these areas would experience higher rates of spread, similar to those in the South Fork Payette River. Alternatives 4 and 6 would see less expansion, due to the more extensive use of prescribed wildland fire.

Table N-17. Estimated Rush Skeletonweed Expansion During the Short Term

Alternatives	Estimated Annual Rate of Spread	Estimated Acreage After Ten Years	Rationale for Alternative Groupings and Rates
1B, 2, 3, 5, and 7	10 - 20%	70,846 – 177,688	Spread along road systems, especially south facing slopes. Resistance to chemical and mechanical treatment, negative response to early summer sheep grazing.
4 and 6	5 - 15%	42,672 – 113,729	Negative to neutral fire response.

Table N-18 represents the combined estimated rate of spread for the five species after ten years. Overall, the alternatives are most influenced by the spread of knapweeds and rush skeletonweed. Alternatives 1B, 3, 5, and 7 would likely have the largest rates of spread, which is primarily due to the higher risks of seed dispersal associated with activities and practices.

There are five other species that may become key species for control on the Ecogroup in the near future. They are orange hawkweed, Dyers woad, purple loosestrife, yellow toadflax, and Dalmatian toadflax. These plants are either not on the Forests at this time but are in close proximity (Dyers woad, purple loosestrife), or their current rates of spread are relatively low (yellow and Dalmatian toadflax) in part because of on-going control efforts.

Table N-18. Ten-Year Acreage Estimate of Key Weed Species in the Ecogroup

Alternative	Weed Infestation Acres After Ten Years
Alternative 1B	96,051 – 243,387
Alternative 2	92,035 -- 221,510
Alternative 3	96,051 – 243,387
Alternative 4	66,765 – 171,886
Alternative 5	96,051 – 243,387
Alternative 6	66,765 – 171,886
Alternative 7	96,051 -- 243,387

Exotic Plant Invasion Into Wildfire Areas

The risk of exotic plant infestations occurring within wildfire areas will be a concern under all the alternatives, and this risk is taken partially into consideration in determining areas of high susceptibility. However, determination of areas with high susceptibility does not take into consideration areas at risk for uncharacteristic stand-replacing fires or characteristic lethal fires. Where stands are replaced with an early successional stage with large proportions of exposed soil, there is an increased potential for exotic plant invasion. Forested PVGs 1, 2, 4, and 5 present the greatest risk, as these groups typically occur adjacent to or in conjunction with areas of high susceptibility to key noxious weed species invasion, and have fire regimes that are currently most departed from historical conditions. These PVGs occur more frequently on the Boise and Payette National Forests. Therefore, this analysis is confined to those two Forests. For the Boise National Forest, Alternatives 2, 3, 4, 6 and 7 reduce the overall hazard below the current condition in the long term. Because of more hazardous desired conditions, Alternatives 1B and 5 would increase the overall hazard above the current levels in the long term. For the Payette, overall hazard increases for all alternatives. This is different from the Boise because the Forest starts out with a far less hazardous condition, particularly in PVG 5. Alternatives 1B and 5 produce the greatest hazard in these areas over the long term.

Cumulative Effects

Noxious weeds do not recognize political or administrative boundaries. Effective management must involve all affected parties including local, regional, state and other federal agencies, public land users, industry, and private landowners. Idaho finalized a state strategic plan for managing noxious weeds in 1999 (ISDA 1999). The purpose of the plan is two fold: 1) to heighten the awareness among all citizens of the degradation brought to Idaho lands and waters by the explosive spread of nonnative weeds, and 2) to bring about greater statewide coordination, cooperation and action that will successfully halt the spread and restore infested lands to a healthy and productive condition. The plan recommends the statewide formation of Cooperative Weed Management Areas and Integrated Weed Management practices.

The establishment of Coordinated Weed Management Areas (CWMAs) and their level of cooperation and coordination will play a significant role in how effective Forest Plan Alternatives will be in the prevention, eradication, containment, and control of noxious weeds. Three CWMAs have already been established and three more are currently being proposed. The Upper Payette and Salmon CWMAs have been very effective in their initial stages. The management ability of multiple agencies and private ownerships will, in part, be dependent on the amount of flexibility available for Integrated Weed Management. Alternatives 2 and 3 will provide the greatest opportunity for flexibility. Alternative 4 and 6 will likely limit the number of new infestations, but will increase the levels and amount of coordination and logistics needed. As a result, these alternatives are more dependent on good communication and relationships, which come with potentially greater risks in accomplishing outcomes. Alternatives 1B and 5 rely more heavily on treatment and will likely cost more for implementation.

Looking at the three Forest's noxious weed influence to the broader scale of the ICBEMP Ecological Reporting Units, the following trends for the alternatives can be expected:

- Under all alternatives, the extent of the Forests' contribution of the five noxious weed species to the Upper Snake, Central Idaho Mountains and Owyhee Uplands is expected to increase. The Central Idaho Mountains would see the greatest increases due to the significant potential rates of spread, proximity of noxious weed seed sources, and the amount of the landscape highly susceptible to invasion on the three Forests. Alternatives 3 and 7 are expected to provide the best opportunity for minimizing the extent of long-term exotic plant spread because of the short and long-term emphasis on vegetative community restoration and the potential greater range of treatment options. Alternatives 1B, 4, and 5 would see the greatest extent of contributions of exotics in the long term.

- Under all alternatives, perennial grasslands, sagebrush (on the Boise Forest and northern portion of Sawtooth) and PVGs 1, 2 and 5 will likely see the greatest expansion of the five noxious weeds analyzed after several decades. Alternatives 3, 4, and 6 will potentially see the least contributions in the forest vegetation groups over the long term (five deceades) because of the lowered risk of uncharacteristic wildfire. See the *Vegetation Hazard* section of this EIS and associated technical report for more detailed information. Alternatives 1B, 2, and 7 will see more risk to PVGs 2 and 5 due to the amount of acreage in moderate and high density condition and the amount of expected disturbance over the long term. These contributions will be most apparent on the Boise Forest and secondly on the Payette Forest. While Alternatives 4 and 6 have a reduced risk in the forested vegetation groups, they are ranked the highest for the non-forested vegetation communities. This risk is due to the increased number of sagebrush acres in the very high canopy closure class, creating the potential for greater burn severity and larger wildfires. Site recovery from high intensity fires can be a limited/slow process and creates an environment for greater weed cover (Goodwin et al. 2002, Asher et al. 1999). As result, post wildfire weed management costs will likely increase under these alternatives (4 and 6), particularly where noxious weeds are present. These contributions will be most apparent on the southern portion of the Boise Forest and most of the Sawtooth Forest.

See also the cumulative effects in the *Vegetation Diversity* section for an assessment of effects on non-forested vegetation at the Ecological Reporting Unit scale

Terrestrial Wildlife Habitat And Species

INTRODUCTION

Terrestrial wildlife species viability is dependant upon maintaining a mix of vegetation quantity, quality, and distribution (habitat). Wildlife use different vegetative and structural stages (condition of one kind of vegetation as it changes through time) for feeding, reproduction, and cover (Thomas et al. 1979). Vegetation change, both natural and human-caused, and human use of the land are the major influences on terrestrial wildlife. Spatial characteristics of landscapes—such as fragmentation, patch size distribution, and connectivity—are largely determined by management actions and their interactions with natural disturbances such as fire, insects, and disease. The landscapes of the Ecogroup represent diverse, highly complex systems that have been affected by many factors, including the interaction of soils, aspect, elevation, climate, and disturbance. All of these influences have shaped vegetative composition and patterns that, in turn, have influenced the distribution of biodiversity across the landscape (Mehl et al. 1998).

Historically, fire, insects, storms, disease, animals, and plant succession were the agents that modified habitat and caused disruption of species use of habitat (Graham et al. 1997, Morgan and Parsons 2001). Fire has been a dominant influence historically in the northern Rocky Mountains (Agee 1999, Gruell 1983). Over time, ecosystems fluctuate within some range of variability related to the disturbances that occur within them. The term "historical range of variability" (HRV) has been used to describe these fluctuations in ecosystems, using conditions prior to Euro-American settlement as a reference point (Morgan et al. 1994). Historically, low-elevation forests in the western Rockies often burned frequently (every few years), with low-intensity ground fires, leaving most of the large trees alive. By contrast, high-elevation forests usually burned with stand-replacing fires that killed most trees, but at infrequent intervals, as much as hundreds of years apart.

Today, fire regimes in some forest vegetation types have substantially changed, due mostly to increases in vegetation densities and fuel loadings that are outside the historic range of variability (see *Fire Management* and *Vegetation Hazard* sections). This, in turn, has led to increases in stand-replacing fires in areas where they historically did not typically occur, resulting in dramatic changes in wildlife habitat. The increases in vegetation densities and fuels have been largely caused by human suppression and exclusion of fire in ecosystems that historically had relatively frequent fire return intervals. Humans have caused other major changes in vegetative patterns through such activities as timber management, livestock grazing, road and facility construction, mining, and recreation. Habitats adjacent to the Forests have changed or been converted to agricultural use, urban development, dams, or water diversions which have influenced species that use Forest-administered lands. In addition, increases in human use and access have increased disturbance to wildlife species, and disruption and fragmentation of their habitats (Forman et al. 1997).

Similar changes in fire regimes have occurred in shrub and grassland environments. Fire exclusion, livestock grazing, roads, and non-native plants have altered shrubland and grassland structure and composition in many areas. In some areas, shrub density has increased while the grass/forb communities have decreased. These factors have influenced vegetation development, patterns, and distribution of habitats for species that use these cover types (Wisdom et al. 2000).

This analysis looks at how the management alternatives for Forest Plan revision either contribute to or mitigate changing patterns of habitat alteration and fragmentation, and disturbance to wildlife. Particular attention is paid to those species whose viability may be affected by the alternatives and their associated activities. Federal regulation 36 CFR 219.19 requires that viable populations of all native and desirable non-native vertebrate species be maintained at the planning area level. Species with a viability concern include those listed or proposed for listing under the Endangered Species Act, those on the Regional Forester's sensitive species list, species at risk, and Forest Management Indicator Species for which populations and habitat conditions may be a concern. Currently, there is no approved or standardized viability analysis approach used by the Forest Service, and the discussion is continuing at the national level. Two commonly used but different approaches (Andelman et al. 2001, Holthausen et al. 1999) indicate the need to analyze viability for different types of species, and this EIS analysis has borrowed from both of these approaches. Additional species and habitats of concern for the planning area have been identified through Idaho Partners In Flight (2000) and Wisdom et al. (2000).

Issues and Indicators

Issue Statement 1 – Forest Plan management strategies may affect habitat for terrestrial wildlife species, including species that are listed or proposed for listing under the Endangered Species Act, Region 4 sensitive species, species at risk, and Forest Management Indicator Species.

Background to Issue 1 – The *Preliminary AMS for the Southwest Idaho Ecogroup* (USDA Forest Service 1997) identified a Need For Change to develop integrated and consistent direction to provide for connectivity of habitat while providing sufficient habitat quantity, quality, and distribution for species viability. Also, there is a need to contribute to the protection, recovery, and de-listing of threatened and endangered species.

Management alternatives and their associated activities may have many effects on terrestrial wildlife habitat and species. Alternatives that would increase activities such as road construction, timber harvest, livestock grazing, recreation, and mining could also increase habitat alteration and fragmentation, as well as disturbance to species. These impacts, in turn, could negatively affect species viability. Viability is a concern for all terrestrial species, but particularly for threatened, endangered, proposed, or sensitive species for which habitat and/or populations are currently in decline or suspected. Effects are analyzed for these species, and for Forest Management Indicator Species that have been chosen to represent local habitats or populations of concern.

Indicators for Issue 1 – Effects to most species in this analysis are measured by changes to habitat and habitat trends. For selected species, effects are displayed through anticipated changes to potential vegetation groups or cover types and the following vegetation components:

- Vertical structure,
- Size class,
- Density,
- Species composition,
- Snags and coarse woody debris.

The indicators are designed to show the relative amount of impact by alternative from those management activities that have the greatest potential for impacts. Differences between alternatives are displayed by the use of SPECTRUM modeling outputs, which show relative changes in the number of acres of PVGs and structural stages as they relate to habitat for different species. However, in order to better reflect the reality of program or project implementation, these indicators need to be assessed with respect to the resource protection methods that would be implemented to mitigate effects.

Issue Statement 2 - Forest Plan management strategies may affect disruption, vulnerability, and disease risk to terrestrial wildlife species.

Background to Issue 2: Some species of wildlife are sensitive to human activities in close proximity during the breeding, nesting and wintering portions of their life cycles. Human activities, whether intentional or unintentional, can increase stress to some species and may reduce their reproductive success.

For example, bighorn sheep populations have declined in the Ecogroup area during the last 100-150 years. Although these species have no status under ESA, the U.S. Fish and Wildlife Service is concerned about their population status and viability (Quigley and Arbelbide 1997c, Wisdom et al. 2000). One threat may be the potential risk of disease transmission from domestic sheep. The current Forest Plans lack management direction for this situation.

The *Preliminary AMS for the Southwest Idaho Ecogroup* (USDA Forest Service 1997) identified a Need For Change to give direction to decrease the adverse affects of access that may cause disruption to species during critical life stages.

Indicators for Issue 2: Effects to species in this analysis are measured by changes in disruption, vulnerability, or the risk of disease. Species considered in this analysis include wide-ranging carnivores such as gray wolf and wolverine, habitat generalists such as elk, and species that spend considerable time nesting or roosting, like bald eagles and bats. Bighorn sheep are also considered due to their susceptibility to fatal diseases that are known to occur in domestic sheep and goats. Indicators used to show changes in disruption, vulnerability, or the risk of disease are taken from Wisdom et al. (2000):

- Risk of human-related disruption to wide-ranging carnivores and other species.
- Road densities related to road construction and decommissioning, and roadless areas.
- Acres of suitable domestic sheep range within bighorn sheep habitat.

Affected Area

The affected area for direct and indirect effects on terrestrial species is National Forest administered lands within the Ecogroup area. The vegetative communities within Forest boundaries could be influenced by implementation of any of the revised Forest Plan alternatives. The affected area for cumulative effects includes all land ownerships within and adjacent to the boundaries of the Ecogroup Forests. Species using habitats do not recognize administrative boundaries, and implications from vegetation management often extend beyond Forest boundaries.

CURRENT CONDITIONS

Fragmentation and Disturbance/Disruption

The ability of terrestrial habitat to support viable populations of terrestrial species is dependant on vegetation quantity, quality, and distribution through both space and time. Habitat can be fragmented by natural events such as fire and insect and disease outbreaks, and human activities such as timber management, roads, dams, diversions and facility construction. Fragmentation of habitat is the isolating or splitting of similar habitat into smaller and more separated pieces. As pieces of habitat become smaller and farther apart, it becomes more difficult for species to make use of them and persist into the future (ICBEMP 1996b).

Human activity other than habitat modification or fragmentation can influence some species through disturbances or disruption. Wildlife behavior in response to human activities generally takes the form of avoidance, attraction, habituation, or indifference, as in no response (Knight and Temple 1995).

Several variables influence disturbance, and therefore the response of an animal to disturbance. These variables may include the type, predictability, frequency, magnitude, timing, and nearness of disturbance. Some individuals respond differently then others to the same disturbance, often due to group size, age, or sex. These responses may vary during different life stages of a given species (Knight and Temple 1995, Wisdom et al. 2000). For example, an individual may be disturbed by human proximity during nesting or denning when young are present, causing disruption to its reproductive cycle, but that same individual may be indifferent to human proximity during other seasons of the year.

Vegetation and Habitat Changes

The Forest Service is primarily responsible for wildlife habitat management on lands it administers. Idaho and Utah state fish and wildlife agencies have authority to carry out statutory policy to preserve, protect, perpetuate, and manage all fish and wildlife species. Close cooperation between the different state and federal agencies is necessary to ensure proper management of the fish and wildlife resources for the public.

The Forest Plan Revision Team has classified and identified 11 forest potential vegetation groups (PVGs), and 10 shrubland/grassland cover types. These vegetation groupings and their successional stages, interacting with physical components of the landscape, make up the basic components of habitat for terrestrial wildlife. The eleven forest PVGs are groups of habitat types that reflect moisture and elevations gradients that exist across the landscape (Mehl et al. 1998, Sallabanks 1996). Current conditions in plant communities indicate that some of these communities have substantially changed from what they were historically (see Vegetation Diversity section, Geier-Hayes 1995, Graham et al. 1997, Quigley and Arbelbide 1997a, Morgan and Parsons 2001, Sloan 1998).

In general, vegetation species composition has shifted from early seral to climax in a number of PVGs and cover types compared to the HRV. Some of these changes are particularly evident in PVGs that historically maintained a large portion of the area in early seral species due primarily to fire. For example, in PVGs 1 and 2 the predominate cover type was ponderosa pine, which is adapted to the frequent, nonlethal fires that were common historically. Many factors have produced a shift from ponderosa pine toward climax Douglas-fir in portions of these PVGs. In these areas, the amount of ponderosa pine has declined below the estimated historical levels and Douglas-fir has increased. Early seral species that were not a dominant feature on the landscape have also declined below historical estimates. Both western larch and whitebark pine, early seral species in the grand fir and subalpine fir PVGs, have in most cases declined. Whitebark pine, in particular, is experiencing high mortality rates due to a host of factors, but especially blister rust (Smith and Hoffman 2000). While some of these agents caused mortality in historical times, regeneration has declined with the advent of fire exclusion. In addition, mortality of smaller-diameter trees has been greater than in larger-diameter trees (Smith and Hoffman 2000), further reducing opportunities to retain whitebark pine on the landscape over the long term.

It is estimated that Idaho and Utah provide habitat for 364 species of breeding vertebrates (13 amphibians, 22 reptiles, 230 birds and 99 mammals) that occur in forested and non-forested habitats (Groves et al. 1997, Spahr et al. 1991). About 300 of these vertebrate species are known to occur within the Ecogroup area (Groves et al. 1997).

Vegetation management practices, fire and fire suppression, insects, non-native plants, disease, livestock grazing, climate, and plant succession are currently the agents that modify non-forested habitats the most. It is important to recognize that natural disturbances do not necessarily create the same conditions as mechanical treatments or livestock grazing (Quigley and Arbelbide 1997a). In forested areas that have been harvested, stand densities and species composition have been generally altered, resulting in a reduction of large-sized trees. Harvest areas and areas that have been protected from fire have regenerated with tree species that are more tolerant of shady conditions. New roads were constructed to access most of the harvest areas, and many of these roads are still present, contributing to habitat fragmentation and potential human disturbance to species. Conversely, areas that have not been harvested, but that have had fire excluded, have developed uncharacteristically high levels of tree densities and fuel loading, and are now dominated by climax plant species, which has increased the risk of insect activity and stand-replacing fire. Similar changes have occurred in non-forest vegetation. Fire exclusion and livestock grazing have altered shrubland and grassland structure and composition in many areas, which has also affected wildlife habitat. In these areas, shrub density has increased while grass/forb communities have decreased.

These and other factors have influenced vegetation development and patterns, and distribution of habitats. The potential to diminish biological diversity can be high if current conditions are outside of, and remain outside of, the historical range of variability. However, this does not mean we must return our forests completely to the range of historical conditions to sustain biological diversity (Morgan and Parsons 2001). Historically, environmental conditions were variable and modified habitats over both the short and long term.

Recent information suggests that past management practices have had impacts on vegetation within and adjacent to National Forests (Geier-Hayes 1995, Quigley and Arbelbide 1997c). Also, habitats adjacent to the Forests have changed or been converted to agricultural use or urban development, which has influenced species that use Forest administered lands. Some species that use habitat on the Forests may spend some of their life off the Forest and be influenced by activities in these locations. Additionally, non-native wildlife species have been introduced that use habitats differently than native wildlife species, and may compete with native species.

The Ecogroup area is not one uniform block of habitat within Forest Service administration. The northern portion is a large contiguous tract of land of over six million acres that varies from 1,600 to 11,800 feet in elevation. Within this regional area are countless types and variations of habitat that merge into one another gradually or are separated by abrupt natural and human-caused breaks. Also, within the Forest administrative boundaries are lands of other ownership (private, State, BLM) that are often managed under different goals and objectives.

The Snake River Plain separates the southern portion of the Ecogroup from the northern portion. The southern portion is comprised of five relatively small, higher-elevation isolated parcels that are mostly surrounded by agricultural development on lower-elevation private lands. Within these areas, other land ownership (private, State, BLM) also occurs. Some of these ownerships are actively managed, and some are not.

Some landscape formations that are important as habitat are not related to vegetation, but at times can be modified by management activities. Some of these formations are caves, talus slopes, large rock outcrops, and rim rock canyons. These types of habitats are used by species such as bats, amphibians, and reptiles, to mention a few.

It must be acknowledged that species populations may fluctuate (up and down) with no change in habitat. These fluctuations may be due to climate changes, disease, predation, excessive harvest, competition or displacement from exotic species, and other factors not related to habitat changes. A change in habitat (loss, reduction in density, fragmentation, or habitat made inaccessible) could also cause additional change in populations. For migratory species, a change in population may not represent changes in local Forest habitat conditions. Many species migrate off Forest at different times of year and are influenced by activities or conditions that occur off Forest. However, the Forest Service still has an obligation under the Migratory Bird Treaty Act (MBTA) and Executive Order 13186 relative to migratory birds while they are on National Forest System lands. The U.S. Fish and Wildlife Service has developed a list of species (Birds of Conservation Concern) relative to the MBTA, but a Memorandum of Understanding has not been finalized between the agency and the Forest Service on how these species will be addressed (USDI FWS 2002).

Threatened and Endangered Species

Special management emphasis is given to species for which there is a documented viability concern. Species listed under the ESA fall into four categories based on viability concerns: Threatened, Endangered, Proposed, and Candidate. The Forest Service has a legal requirement to maintain or improve habitat conditions for threatened, endangered, and proposed species under the ESA. Administrative direction also exists to maintain or improve conditions for species on the Regional Forester's sensitive species list, and for Management Indicator Species, which are addressed in Forest Service Manual 2670, and Handbook 2609.

The U.S. Fish and Wildlife Service (USFWS) has not identified any critical habitat within the Ecogroup area for terrestrial species currently listed as threatened or endangered under the ESA. Recovery plans and Biological Opinions are developed for threatened and endangered species by the USFWS. Recovery plans and Biological Opinions provide goals and actions needed to recover species. Threatened, endangered, proposed, or candidate species that may occur within the Ecogroup area, their locations, and important consideration for management are described in Table W-1.

Table W-1. Locations and Management Considerations for Threatened, Endangered, Proposed, or Candidate Species in the Ecogroup Area

Type	Common Name	Forest*	Global Rank	PVGs or Cover Types+	PVGs or Cover Types^	Management Considerations
Mammal	gray wolf	All 3	G4	All	All	Vulnerability during denning
	northern Idaho ground squirrel	Payette	G2	1, 2, 4, 5	2	Vulnerability, specific habitat needs
	Canada lynx	All 3	G5	3, 6, 7, 9, 10, 11	3, 6, 7, 9, 10, 11	Vulnerability, prey abundance during the winter
Bird	bald eagle	All 3	G4	All	2, 3, 4, 5, 6, 7, 8, 9	Nest stand, prey availability
	Yellow-billed cuckoo	All 3	G5	Cottonwood riparian forest	Cottonwood riparian forest	Nesting and foraging

* Forest or Forests in the Ecogroup where this species occurs.
+ Potential Vegetation Groups or cover types that species use.
^ Potential Vegetation Groups or cover types that provide primary habitat needs of this species.
Global Rank is a system of ranking the range-wide status of species maintained by State Conservation Data Centers and Natural Heritage Programs throughout North America and several other countries. Numerical rankings range from G1 to G5, where G1 species are considered critically imperiled at the global scale, and G5 species are considered globally widespread, abundant, and secure, although there may be concerns for the viability of local populations. Many researchers believe that species ranked G1-G3 need special consideration or mitigation for management activities that may negatively affect their habitat because their long-term viability is currently a concern (Andelman et al. 2001)

Gray Wolf (*Canis lupus*)

Wolves are native to Idaho and Utah. They are habitat generalists, and historically they were fairly common in most parts of the state with big game herds. The basic social unit in wolf populations is the pack. A pack can consists of 2 to 20 wolves (average of 10). Pack members have a strong social bond to each other, and they establish and defend territories. Territories range in size from 80 square miles in Minnesota to over 600 square miles in Alberta. Home ranges for Central Idaho packs range from 360 square miles to 2000 square miles over the last several years.

From about 1860 to the mid-1930s, a series of events resulted in the eradication of wolves from the western United States and southern Canada. The Idaho legislature passed a law in 1907 authorizing the Idaho Department of Fish and Game to devise and put into operation such methods and means as would best secure and obtain the extermination of wolves, coyotes, wild cats, and cougars. Ultimately, the introduction of processed strychnine in 1920 spelled the doom of the gray wolf throughout the West. Despite efforts to exterminate them, wolf reports persisted in Idaho from the late 1920s through the 1970s. These were believed to be dispersing animals from Canada.

Although the gray wolf is considered an endangered species throughout much of its range, including northern Utah, the populations south of Interstate 90 in the State of Idaho and Montana are considered Experimental/non-essential. In 1994, the USFWS approved the Final EIS for the

Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho (USDI FWS 1994). In November of that year, final rules were issued for the establishment of Experimental/non-essential populations of gray wolves in Yellowstone and central Idaho. One of the rules states that all wolves found in the wild within the boundaries of the management areas after the first wolf releases are considered experimental/non-essential animals (USDI FWS 1994). Except for the Raft River unit on the Sawtooth National Forest (which is in Utah) the entire Ecogroup area is within the experimental/non-essential population management area for central Idaho.

The U.S. Fish and Wildlife Service, as the agency initiating the Reintroduction Plan, analyzed and documented the potential effects of various land management activities through their Final EIS. The June 15, 1994 Notice of Record of Decision and Statement of Findings on the EIS for the Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho, by the USFWS states,

> "No conflicts are envisioned with any current or anticipated management actions of the U.S.D.A. Forest Service or other Federal agencies in the experimental areas. Forest Service properties are a benefit to the project since they form a buffer to private properties in many areas, and management activities on National Forests are typically conducive to production of numerous prey animals."

The Reintroduction Plan did provide for temporary use of land use restrictions by land and resource managers to control intrusive human disturbance near active den sites between April 1 and June 30, when there were five or fewer breeding pairs of wolves in the experimental/non-essential population.

In the Central Idaho Experimental/Non-essential Population Management Area, 15 Canadian wolves were released in 1995; and 20 Canadian wolves were released in 1996. By 1999, there were wolves breeding on each of the three Forests, and packs on the Boise (2), Payette (2), and Sawtooth (2) had formed. Recovery is occurring at a faster rate than expected. The recovery goal for wolves in central Idaho is 10 breeding pairs for three consecutive years (USDI FWS 1994). Based on the December 2002 Idaho wolf population estimate, there are an estimated 280 wolves with 19 packs and 10 breeding pairs in the central Idaho recovery area. There have been no documented wolves in the Raft River unit in northern Utah.

The primary threat to wolves is mortality from shooting and vehicle collisions (Quigley and Arbelbide 1997c, Wisdom et al. 2000). Primary management concerns for the Forest Service are (1) disturbance to denning wolves when pack numbers are low within individual recovery areas, and (2) providing adequate habitat for populations of prey species such as elk.

Bald Eagle (*Haliaeetus leucocephalus*)

Nesting habitat on the Forests is associated with large rivers—such as the Salmon, North Fork Payette, South Fork Boise, and Snake—or large lakes and reservoirs, such as Cascade Reservoir, Anderson Ranch Reservoir, Arrowrock Reservoir, Warm Lake, and Lost Valley Reservoir. Nests are commonly found in large trees, mainly conifers and cottonwoods, and usually near water. Because eagles build large nests, nesting habitat is often found in multi-story, old forest stands with open canopies (Quigley and Arbelbide 1997c). Nests can also occur in single, isolated trees if the trees are strong enough to support them.

During the breeding season, bald eagles eat mainly fish. They also eat waterfowl, shorebirds, upland birds, and small mammals. Eagles are opportunistic foragers, especially during the winter, when they will eat whatever is available, including live fish, waterfowl, small mammals, and carrion. Wintering bald eagles tend to congregate near bodies of unfrozen water and roost communally. Major rivers and large reservoirs constitute the majority of winter habitats used, although the temporary presence of high-quality foods may entice eagles to areas far removed from aquatic zones. Roost sites are usually located in stands/clumps of mature or old conifers or cottonwoods.

Eagles are currently nesting on the Boise (10 nests) and Payette (1 nest) Forests, and winter roosting on all three Forests. There are approximately 21,000 acres of existing nesting habitat, an additional 8,000 acres of potential nesting habitat, and 170,000 acres of wintering area within the Ecogroup area. The number of occupied bald eagle territories within Idaho continues to increase. USFWS Recovery Plan goals for management zones for this portion of the population have been exceeded during the last ten years. The USFWS has proposed to de-list the bald eagle because of positive population trends within this and other recovery areas.

Canada Lynx (*Felis canadensis*)

There has been considerable interest in habitat potential and viability for lynx during the last several years. The proposed rule to list population segments as threatened was published in the Federal Register on July 8, 1998 (63FR 36994). The lynx was listed as threatened under ESA by the USFWS in March of 2000.

Major risk factors for lynx include direct human threat (shooting, trapping, vehicle collisions), as well as changes in forage and denning habitat. Lynx have evolved a competitive advantage in deep snow environments due to their large paws that allow them to hunt prey where other predators cannot because of snow conditions. However, snow trails compacted by human activity may allow other predators to access prey in deep snow conditions where historically they were excluded. Advances in snowmobile capabilities have raised concerns about intrusion into previously isolated areas (Wisdom et al. 2000). Human access into lynx habitat during winter can also increase threats, because lynx can be detected or disturbed by snowmobiles traversing vast forest areas in short periods of time. This increased access can also increase lynx vulnerability to harvest, collision, or harassment.

Lynx are usually more active at night than during the day. The eyes of lynx are well adapted for night hunting. Preferred winter food consists primarily of snowshoe hares, along with rodents such as red squirrels, and birds. Suitable habitat for hares generally consists of young conifer stands with relatively dense and interconnected canopies that provide both cover and food. Fire suppression has reduced the quality and quantity of hare habitat by reducing the amount of conifer regeneration. Little is known about habitat for snowshoe hares in terms of patch size and spatial arrangement in this portion of Idaho. Denning habitat for lynx occurs in mature and late structural boreal forests with locally abundant large woody debris present.

Roads and trails have resulted in increased human access and activity in lynx habitat, particularly during critical winter months. Many of the existing routes are closed to motorized travel during certain times of the year but are open to over-the-snow travel and provide popular snowmobile opportunities. Packed snow trails made by snowmobiles can allow other predators, such as coyotes that would normally be excluded because of snow conditions, to compete with lynx for prey. Lynx use roads and packed trails for travel, which may make them more vulnerable to human-caused mortality. Fire suppression and logging have altered the mosaic of habitats needed for prey species and denning sites (Wisdom et al. 2000, USDI FWS 2000). Abundant quality and quantity of snowshoe hare habitat appears to be limited within the Ecogroup area.

Lynx may be present in the Ecogroup area, but no population numbers are available (Wisdom et al. 2000). Lynx occurrences have been documented within the Ecogroup area, some as recent as the 1960s and 70s. There have been several recent creditable observations of lynx within the area. It would appear, however, that the species was never common in this area, as it is further north in Canada. During 1999, 2000, and 2001, lynx hair sampling surveys were conducted on all three Forests. Lynx hair samples were only detected on the Boise National Forest during 1999. (The hair surveys were not intended to be population or presence/absence surveys). A more complete description of lynx historical occurrence for local areas in Idaho is found in Lewis and Wenger (1998).

During 2002, an effort was started that would amend existing Forest Plans that are not in the process of Forest Plan revision. The Southwestern Idaho Ecogroup Forests are within the Northern Rockies Lynx Amendment area but are not included in the amendment process because they are in the process of plan revision. The intent of this amendment is to make existing plans not currently in revision consistent with the Lynx Conservation Assessment and Strategy (LCAS) (USDI FWS 2000). The Boise, Payette, and Sawtooth Forests are in the process of plan revision and have incorporated direction that is consistent with the LCAS because they are not be included in the Northern Rockies amendment process.

Northern Idaho Ground Squirrel (*Spermophilus brunneus brunneus*)

The northern Idaho ground squirrel is the most imperiled terrestrial species in Idaho. This squirrel is the only mammal in Idaho that occurs in Idaho alone, and population numbers have been declining. This ground squirrel occurs in meadows adjacent to forest clearings surrounded by ponderosa pine and Douglas-fir. The meadows usually have shallow soil, with intrusions of deeper soils. The areas of deep soil are necessary for nest burrows. The squirrel is known to occur in only two counties and in fewer then 25 locations. All current occupied sites are on the west side of the Payette National Forest or adjacent private lands, except for a single site in Valley County. It is known that the squirrel has been extirpated from a number of locations where it historically occurred, including locations on the Boise National Forest. The total population is currently estimated at 250-500 individuals. About half of the known populations occur on the Payette National Forest (Yensen 1991).

Because of the current very low population numbers, any losses from any cause are of great concern. With such low population levels, major threats include vulnerability to shooting, poisoning, trapping, road kill, and predation. Disturbance from recreation activities and livestock grazing is also a concern. A variety of fine-scale habitat issues—such as exotic vegetation, reduced native grasses and forbs, tree and shrub encroachment, and fire suppression—are important management considerations.

Given the low population levels and disjunct habitat that presently occurs, viability is a concern for this species (Moroz et al. 1995, Wisdom et al. 2000). In 1996, a Conservation Agreement between the Payette Forest and the USFWS was approved to address this viability concern. Prior to and since this agreement, the Payette Forest has been implementing habitat improvement projects to decrease tree encroachment on current occupied sites, and to connect isolated populations. In March of 1998, the USFWS proposed that the northern Idaho ground squirrel be listed under the ESA as a threatened species. It was listed as threatened under the ESA by the USWFS in April of 2000. The USFWS released a ground squirrel Draft Recovery Plan for public comment in July 2002.

Candidate Species

Yellow-billed Cuckoo *(Cocyzus americanus)*

The yellow-billed cuckoo inhabits extensive deciduous cottonwood forests with dense shrub understories. This species is known to occur in Idaho and is considered a peripheral species in Idaho by the Idaho Partners in Flight (IPIF 2000). Populations are rare in Idaho but are known to occur in eastern Idaho on the South Fork of the Snake River below Palisades Reservoir, an area with extensive cottonwood forests (Groves et al. 1997). This species is declining in parts of its range due to deterioration and loss of riparian forest habitat. Principal causes of riparian cottonwood forest habitat loss are conversion to agricultural and other uses, dams and river flow management, stream channelization and stabilization, livestock grazing, and competition from exotic plants. Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western United States. The breeding population of yellow-billed cuckoos in Idaho is likely limited to a few breeding pairs, at most. Population numbers have declined substantially across much of the western United States over the past 50 years (Federal Register Vol. 66, No 143, 2001). The yellow-billed cuckoo is currently a Candidate species in this area for listing under the ESA.

Western yellow-billed cuckoos breed in large blocks of riparian habitat with a dense understory of foliage. This understory appears to be important for breeding success. The large blocks of riparian habitat for nesting are usually greater than 25 acres (Federal Register Vol. 66, No 143, 2001; Saab, 1992).

There are areas that contain cottonwood riparian forest within the Ecogroup. Few if any of the areas could be considered extensive. Most of the cottonwood forest within Forest Service administered lands occurs on high-gradients streams (steep), which results in narrow, linear pieces of habitat. Some private in-holdings adjacent to Forest Service administered lands contain cottonwood forest that could be considered extensive. No records of yellow-billed cuckoos have been documented within the Ecogroup on Forest Service administered lands.

Recently De-listed Species, as of 1999, and Currently a Sensitive Species

Peregrine Falcon (*Falco peregrinus*)

Peregrine falcons associated with the Ecogroup area are part of the Rocky Mountain population (USDI FWS 1984). The objectives from the recovery plan were 17 breeding pairs in Idaho, and 21 breeding pairs in Utah. Since 1982, 288 captive-reared young have been released in Idaho.

The first re-established pair was discovered in 1985. The current reproductive level has been sufficient to support considerable population growth. The USFWS American Peregrine Falcon Recovery Plan population objectives have been exceeded. Recently, the USFWS published a final rule to remove the peregrine falcon from its list of endangered and threatened wildlife (USDI FWS 1999). The de-listing was based on the increasing population trend during the last five years.

Peregrine falcons occupy a wide range of habitats, and are typically found in open country near water. They capture prey by striking from above with their talons after a high-speed dive. Foraging habitat includes wetlands and riparian habitats, meadows and parklands, croplands such as hay fields and orchards, gorges and mountain valleys, and lakes that support good populations of small- to medium-sized terrestrial birds, shorebirds, and waterfowl.

Cliffs are preferred nesting sites (known as eyries), although re-introduced birds now regularly nest on man-made structures such as towers and high-rise buildings. Peregrines may travel more then 18 miles from the nest site to hunt for food; however, a ten-mile radius around the nest is an average hunting area, with 80 percent of foraging occurring within a mile of the nest. They migrate south for the winter to the Gulf of Mexico and into Mexico and Central America, or to large rivers and wildlife refuges in the southern United States (USDA Forest Service 1991).

Peregrines declined precipitously in North America following World War II. Research implicated pesticides—particularly DDT, DDE, and dieldrin applied in the United States and Canada during this same period—as causing the decline linked to weakened egg shells (USDI FWS 1984). Use of these chemicals peaked in the 1950s and early 1960s, and continued through the early 1970s (Federal Register Vol. 64, No. 164, 1999).

The most significant event in the recovery of the peregrine falcon was the restriction placed on the use of pesticides. Use of DDT was restricted in Canada in 1970 and in the United States in 1972. Restrictions that controlled the use of aldrin and dieldrin were imposed in the United States in 1974. Since implementation of these restrictions, pesticide residues have significantly decreased in many regions where they were formerly used. Consequently, reproductive rates in most surviving peregrine falcon populations in North America improved, and numbers began to increase (USDI FWS 1984, Quigley and Arbelbide 1997c). In Idaho, the peregrine population has been increasing during the last 10 years.

Other known negative factors—such as illegal shooting and collisions with wires, fences, cars, and buildings—are much less significant to population levels of the peregrine falcon in the West. On an individual nest-site basis, human-caused disturbance or habitat alterations close to an active peregrine falcon nest can be a problem. For example, in some areas, rock-climbing is a growing sport and has resulted in nest failure due to abandonment (Quigley and Arbelbide 1997c). Closure of rock-climbing cliffs in proximity to nesting peregrine falcons has recently prevented adverse effects. Power lines, especially distribution lines, can cause peregrine falcon mortality; but many peregrine falcons nest successfully each year near power lines, especially in urban areas. Land-use practices adjacent to peregrine falcon eyrie that do not result in extensive habitat changes or excessive disturbance appear to have little adverse effect on nesting success.

The recent apparent increase in the number of pairs of peregrine falcons in the West suggests that significant adverse factors affecting the western subspecies at the population level are being alleviated or have been reduced (USDI FWS 1999). Ten years ago there were no known nesting occurring within the Ecogroup. Currently peregrine falcons are known to be breeding on the Sawtooth Forest. There is no known nesting currently on the Boise and Payette Forests, but tall cliff habitat is present for more nesting to occur within the Ecogroup.

Sensitive Species

At present, 16 terrestrial vertebrate species (1 amphibian, 11 birds, and 4 mammals) within the Ecogroup are on the U.S. Forest Service, Intermountain Region sensitive species list (see Table W-2). The list is evaluated annually to see if species need to be added or removed. A revised list is anticipated sometime during 2003, and this list is expected to increase the number of sensitive species. The 1999 sensitive species list was used because it has strongly influenced past and recent management actions conducted under the current Forest Plans. This list has not changed and is still current as of early 2003.

Species are designated "sensitive" by the Regional Forester because their population or habitats are trending downward, or because little information is available on their population or habitat trends. The primary purpose of the sensitive species program is to conserve or restore habitat conditions for these species to prevent them from becoming federally listed under ESA. Regional and Forest Plan direction is designed to restore, protect, and enhance sensitive species habitat and population viability. When species are de-listed as threatened or endangered by the USFWS, they usually are added to the Forest Service sensitive species list if they occur in the area. This was the case with the peregrine falcon when it was recently de-listed. The sensitive species, their locations, and important consideration for management are described in Table W-2.

Table W-2. Sensitive Terrestrial Species of the Ecogroup

Type	Common Name	Forest*	Global Rank	PVGs or Cover Types+	PVGs or Cover Types^	Management Considerations
Mammal	Wolverine	All 3	G4T4	All	All	Vulnerability during denning
	fisher	All 3	G5	3, 4, 5, 6, 7, 8, 9, 10	3, 4, 5, 6, 7, 8, 9	Habitat fragmentation, snags and logs
	Townsend's big-eared bat	All 3	G4	NA	NA	Vulnerability to disruption
	spotted bat	All 3	G4	NA	NA	Vulnerability to disruption
Bird	northern goshawk	All 3	G5	All	2, 3, 4, 5, 6, 7, 8, 9	Nest stand, prey availability
	white-headed woodpecker	All 3	G4	1, 2, 3, 5	1, 2, 3, 5	Large Snags, low crown density
	flammulated owl	All 3	G4	1, 2, 3, 5, 7	1, 2, 3, 5, 7	Large snags and trees
	harlequin duck	Payette	G4	Large streams in forest setting	Large streams in forest setting	Forest Riparian

Type	Common Name	Forest*	Global Rank	PVGs or Cover Types+	PVGs or Cover Types^	Management Considerations
	mountain quail	Payette, Boise	G5	1	1	Shrubby Riparian
	boreal owl	All 3	G5	3, 6, 7, 8, 9, 11	3, 6, 7, 8, 9, 11	Large snags
	northern three-toed woodpecker	All 3	G5	3, 7, 8, 9, 10, 11	3, 7, 8, 9, 10, 11	Abundant snags
	great gray owl	All 3	G5	9, 10	9, 10	Forested areas with meadows
	Columbian sharp-tailed grouse	Sawtooth	G5T3	Native shrub/ grass lands	Native shrub/ grass lands	Shrubby wintering areas
	common loon	Sawtooth	G5	Natural lakes	Natural lakes	Vulnerability during nesting, abundant small fish for prey
	peregrine falcon	All 3	G4T3	High cliffs	High cliffs	Vulnerability during nesting, prey abundance
Amphibian	spotted frog	All 3	G4Q	Riparian areas	Riparian areas	Still or ponded water

* Forest or Forests in the Ecogroup where this species occurs.
\+ Potential Vegetation Groups or cover types that species use.
^ Potential Vegetation Groups or cover types that provide primary habitat needs of this species.
Global Rank = Globally imperiled ranking, from Idaho Conservation Data Center (2002)
NA = Not Applicable

Wolverine (*Gulo gulo*)

The wolverine is a species suited to extensive, usually high-elevation areas. Threats to wolverine include motorized and non-motorized travel during winter and spring denning, especially in forested and alpine ecosystems where human use is presently low and habitats have not been greatly modified. A study of wolverine in central Idaho occurred from 1992-1996, and portions of the Ecogroup were included in the study area (Copeland and Harris 1994). Wolverines are primarily scavengers that forage on carcasses of large ungulates such as elk, moose, deer, mountain goats, and bighorn sheep. They also hunt hares, marmots, ground squirrels, and grouse, but will eat fruits and insects when other items are unavailable.

Wolverine home range sizes are influenced by prey remains and other food sources. Individual animals have large territories and can cover large distances in short time periods. In central Idaho, home ranges have been documented as large as 2,079 square kilometers (802 square miles) for males, although female ranges tend to be smaller. Wolverines do not show strong territorial behavior and have overlapping ranges. They use several habitats and have been located in forested drainage bottoms to high-elevation, sparsely timbered cirque basins. Two natal dens were located in subalpine cirque areas on north-facing slopes, suggesting that this type of habitat is important in central Idaho (Copeland and Harris 1994).

Due to their large home range size and habitat needs, this species is rare and uncommon, and most likely always has been. Habitats within the areas wolverine are known to inhabit are the least modified by human activities, due to their remote, steep, and harsh environments

(Sallabanks 1996). Wilderness and roadless lands account for much of the areas wolverines are known to use (Copeland and Harris 1994). There have been some very large fires in the type of habitat wolverines inhabit on the Payette Forest. These fires were generally characteristic (large in area, infrequent in occurrence, and stand-replacing) for the plant communities and elevations in which they burned.

Human intrusion within denning habitat during the winter is probably the primary threat to this species (Wisdom et al. 2000). Human activities during denning may cause wolverines to relocate to less preferred habitat, which may reduce reproductive success. Moving wolverine young can also expose them to predators and harsh weather when they are vulnerable. Recent technological advances in snowmobile capabilities have raised concerns about intrusion in previously isolated areas (Wisdom et al. 2000) where natal denning may be occurring.

There are no known population trends for the wolverine within the Ecogroup area. Wisdom et al. (2000) estimate an increase of 32 percent of source habitat from historic to current for this species within the Central Idaho Mountains ERU, which includes a majority of the Ecogroup.

Fisher (*Martes pennatia*)
Fishers are a rare predator found in mature to old forests with high canopy closure and large tree (both live and dead) structure. They avoid large openings. They are associated with mesic forest conditions and forested riparian areas. Natal dens have been located in pileated woodpecker cavities and other forest structures. They eat small mammals, birds, fish, amphibians, insects, carrion, fruit, and nuts (Idaho State Conservation Effort 1995). Fishers hunt for prey on the forest floor and in trees and snags (Spahr et al. 1991). Vegetation management and fire suppression have influenced habitat of this species and its prey by altering composition and structure. There are no known population trends for fishers within the Ecogroup area. Wisdom et al. (2000) estimate an increase of 35 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU, which includes an estimated 87 percent of the Ecogroup area.

Boreal Owl (*Aegolius funereus*)
Boreal owls nest in old woodpecker cavities in live and dead trees. Boreal owls are found in high-elevation spruce-fir, mixed conifer, and aspen forests year-round and do not migrate. They are known to prey extensively on redbacked voles. Thirty acres encompass the largest nest sites recorded for boreal owls. Winter home ranges encompass about 3,600 acres. Summer home ranges are slightly smaller (USDA Forest Service 1991). Forest management can change the composition and structure of vegetation used by this species. Management activities that affect large snags and down logs are important habitat considerations for this species. There are no known population trends for boreal owls within the Ecogroup area. Wisdom et al. (2000) estimated an increase of one (1) percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU.

Great Gray Owl (*Strix nebulosa*)
The habitat components considered most important for this species are: (a) mature or older forest to provide suitable nesting sites; and (b) suitable foraging areas that include non-stocked and seedling forests, meadows, and open riparian habitats that are adjacent to meadows. Great

grays hunt from perches and capture their prey on the ground, usually small rodents (Groves et al. 1997). They do not build their own nest, but use existing nests built by other species and debris platforms, or broken-topped trees and snags (Groves et al. 1997, Bull et al. 1997). Great gray owl nest sites average 150 yards from the nearest opening. The largest home range recorded for a great gray owl is 6.5 square kilometers, which is 1,622 acres (USDA Forest Service 1991).

The great gray owl is a year-round resident on portions of the three Forests, but has not been documented on every Forest District. In relation to other owls in the Ecogroup area, this owl is considered rare in terms of abundance because the habitat (mid- to high-elevation old forests near meadows) it prefers is somewhat uncommon. Intensive timber harvest, snag removal, and removing trees with broken tops in forested areas with meadows are important concerns for this species. There are no known population trends for great gray owls within the Ecogroup area. Wisdom et al. (2000) estimated an increase of 32 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU.

Flammulated Owl (*Otus flammeolus*)

Flammulated owls are present on the Ecogroup Forests only during the breeding season and migrate off the Forests to winter. The habitat components considered most important for flammulated owls are: a) mature and old forests of Douglas-fir, ponderosa pine, mixed conifer, including lodgepole pine and aspen; b) a moderate density of large trees, and c) snags used for nesting habitat created by larger woodpeckers and sapsuckers (Spahr et al. 1991, Groves et al. 1997). Thirty acres encompass the entire home range of a flammulated owl pair during the breeding and nesting period. They feed almost entirely on flying insects.

Occupied flammulated owl habitat has changed during the last hundred years due to human activities (Morgan and Parsons 2001, Sloan 1998). Major changes in habitat have occurred within the Ecogroup from: selective harvesting of large-diameter ponderosa pine, snag removal in harvest areas, extensive areas (14 percent) of ponderosa pine mortality from wildfires during the last 15 years, and a change in composition and density of remaining stands because of long-term fire exclusion (Geier-Hayes 1995, Quigley and Arbelbide 1997b, Morgan and Parsons 2001, Sloan 1998, Wisdom et al. 2000). These and other changes have reduced habitat in terms of quality, quantity, and distribution.

This owl has been documented on all ranger districts in the Ecogroup area. Important management considerations for this species include retaining or restoring older mid- to lower-elevation forests dominated by ponderosa pine and Douglas fir, and retaining or restoring snags and down logs (Wisdom et al. 2000). There are no population trends for flammulated owls within the Ecogroup area. Wisdom et al. (2000) estimate a reduction of 52 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU, which includes a majority of the Ecogroup area.

White-headed Woodpecker (*Picoides albolarvatus*)

White-headed woodpeckers are found mainly in open and mature ponderosa pine and mixed ponderosa pine/Douglas-fir forests in Idaho (Frederick and Moore 1991, Groves et al. 1997). They feed on conifer seeds during the fall and winter. Cone crops are different from year to year, and large trees usually produce more cones then small trees. During other times of the year, flying insects are important. Nests are usually excavated in large-diameter snags that have a moderate degree of decay (Bull et al. 1986, Bull et al. 1997). Nesting snags need to be greater than 20 inches in diameter (Wisdom et al. 2000). Nesting stands of ponderosa pine used by white-headed woodpeckers have a low canopy cover, generally less than 30 percent (Frederick and Moore 1991). Based on studies done in Idaho, little migration occurs, and they are considered year-round residents.

The habitat that white-headed woodpeckers occupy has changed during the last hundred years due to human activities (Morgan and Parsons 2001, Sloan 1998). Major changes in habitat have occurred within the Ecogroup area from selective harvesting of large-diameter ponderosa pine, snag removal in harvest areas, extensive areas (14 percent) of ponderosa pine mortality from wildfires during the last 15 years, and a change in composition and density of remaining stands because of long-term fire exclusion (Geier-Hayes 1995, Quigley and Arbelbide 1997b, Morgan and Parsons 2001, Sloan 1998, Wisdom et al. 2000). These and other changes have reduced habitat of white-headed woodpeckers in terms of quality, quantity, and distribution. Because of reductions in late structural ponderosa pine forest and changes in their remaining habitat, this species is being considered as a Management Indicator Species (see MIS, below).

White-headed woodpeckers have been observed on all three Forests, but are restricted to areas that have a significant composition of ponderosa pine, which are more common on the west side of the Boise and Payette Forests than the Sawtooth. Management of large, low-density ponderosa pine, including snags, is an important consideration in mid- to low-elevation forest habitat for this species (Wisdom et al. 2000). There are no known population trends for the white-headed woodpeckers within the Ecogroup. Wisdom et al. (2000) estimate a reduction of 62 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU, which includes a majority of the Ecogroup. It is assumed that the extent of large-tree and snag reduction on the landscape has had a negative effect on species such as the white-headed woodpecker.

Northern Three-toed Woodpecker (*Picoides tridactylus*)

Northern three-toed woodpeckers are primarily associated with mature forests with outbreaks of bark beetles and stand-replacing fires. They have been found within the Ecogroup mostly in lodgepole pine stands with mountain pine beetles, and in burned-over areas (Groves et al. 1997). They forage mainly in dead trees, and a large percentage of their diet are wood-boring insect larvae. They excavate nesting cavities in snags or occasionally in live trees (Groves et al. 1997). This species is considered non-migratory. Management for abundant snag densities that normally occurs in higher elevation forests is an important habitat consideration. The processes (fire, insects and disease) that generate these high densities of snags are essential. There are no known population trends for northern three-toed woodpeckers within the Ecogroup. Wisdom et al. (2000) estimate an increase of 77 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU.

The large fires that burned during 2000 on the Boise and Payette National Forest improved the habitat for this species. These fires burned several hundred thousand acres, of which the majority was forested vegetation. The burned forested acres will be used by this species because of the additional foraging habitat created.

Northern Goshawk (*Accipter gentilis*)
The goshawk is a forest habitat generalist that uses a variety of forest types, ages, structural conditions, and seral stages (Graham and Jain 1998). It preys on small- to medium-sized birds and mammals (robins and chipmunks to grouse and hares), which it captures on the ground, in trees, or in the air. Goshawks and their prey require a variety of forest structures dispersed over large areas (Graham and Jain 1998).

Northern goshawks have been documented nesting in all three Forests on all Districts in all forested PVGs. For this species, a change in population may not represent changes in habitat conditions on the Forests. Population may be influenced by activities off Forest, particularly in wintering areas, which are largely unidentified.

The major changes in habitat that have occurred within the Ecogroup area are: selective harvesting of large-diameter trees, snag removal in harvest areas, extensive (14 percent) ponderosa pine area mortality from wildfires during the last 15 years, and a change in composition and density of remaining stands because of long-term fire exclusion (Forest-wide Monitoring Reports, Sloan 1998, Wisdom et al. 2000).

Nest Areas - Nest areas usually include one or more forest stands, several nests, and several landform characteristics. Nest areas are occupied by breeding goshawks from early March until late September. The size (generally 20-25 acres) and shape of nest areas depend on topography and the availability of patches of dense, large trees.

Goshawks have a high fidelity to nest areas, which are often used more than one year, and sometimes used intermittently for decades (Reynolds et al. 1992, Wisdom et al. 2000). Many pairs of goshawks have two to four alternate nest areas within their home range. All previously occupied nest areas may be important for maintaining nesting populations because they contain the habitat elements that originally attracted the goshawks. Replacement nest areas are advantageous because goshawk nest stands are subject to loss from catastrophic events and natural tree mortality.

Goshawk nest areas typically have high tree canopy cover and a higher proportion of larger trees then surrounding areas. Studies suggest that dense vegetation provides relatively mild and stable microenvironments, as well as protection from predators. Nest areas are usually classified as mature and late structural forest stands (Reynolds et al. 1992, Graham and Jain 1998). Human activity during the nesting period may cause the nest to be abandoned and subsequent nest failure (Reynolds et al. 1992, Braun et al. 1996).

Post-Fledging Family Area (PFA) - PFAs are used by the adults and young from the time the young leave the nest until they are no longer dependent on the adults for food. The PFA surrounds the nest area and, although it generally includes a variety of forest conditions, the vegetation structure resembles that found within nest stands. PFAs vary in size from 300 to 600 acres. PFAs provide the young hawks with cover from predators, and sufficient prey to develop hunting skills, so they may learn to feed themselves before dispersing during mid-summer to fall. Therefore, PFAs should contain habitat attributes for producing prey species.

Managing for current and future nest areas conditions and large adjacent areas that provide prey are important habitat considerations. There are no known population trends for goshawks within the Ecogroup area, but some annual nest monitoring has been occurring in selected locations within the area. Wisdom et al. (2000) estimate a reduction of 7 percent in source habitat from historical to current times for this species within the Central Idaho Mountain ERU. Goshawks also occur on the southern portion of the Sawtooth National Forest, which is not in the Central Idaho Mountains ERU. Source habitat reduction is believed to have occurred in the southern portion of the Forest as well due to past timber harvest (Wisdom et al. 2000).

Columbian Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*)
Sharp-tailed grouse occur on the Sawtooth Forest, but only on one ranger district. Small, isolated populations of these birds use adjacent BLM and private lands. These birds are also known to occur in the Weiser River drainage (Mann Creek), but have not been detected on the Payette Forest.

Sharp-tailed grouse need low-elevation native shrub-grassland year-round. Abundant grass composition appears to be important within shrub/grassland communities during all life stages. During the summer, the shrubs are used for cover, and the grass and forbs are used as food, including insects that are available in these habitats. During the winter, shrubs (serviceberry, chokecherry, bitter brush, bitter cherry, hawthorn, and aspen) increase in importance for food supply because they are above snow cover. In an Idaho study, winter food and cover were regarded as the most limiting habitat factors for long-term maintenance of grouse (Apa 1998, Groves et al. 1997, Spahr et al. 1991).

Sharp-tailed populations statewide have been increasing over the past ten years, but most populations are still small and isolated. Most of this increase has been attributed to the Conservation Reserve Program (CRP) on private lands (Apa 1998, Wisdom et al. 2000). Birds are making extensive seasonal use of the CRP seedings that are maintained in grass/shrub cover year round, year after year. In some locations, these CRP fields are adjacent to the Forest. Livestock grazing management of native shrub/grassland and shrub-dominated riparian areas is also an important management consideration for this species. In the past many areas of shrub/grassland were burned, sprayed/plowed, and planted to non-native grasses to improve conditions for livestock grazing and reduce erosion. These practices would be detrimental to grouse if they take place on wintering areas where shrubs that are used as food and cover protrude above the snow level. Additional threats to sharp-tailed habitat include habitat fragmentation and invasion of exotic plants (Wisdom et al. 2000).

Sharp-tailed grouse currently occupy less than 10 percent of their former range in the Northwest United States, and there has been an estimated 24-56 percent decrease in source habitat in the Ecogroup area (Wisdom et al. 2000). Populations occur in three subbasins within the Ecogroup, Curlew Valley, Raft River and Salmon Falls Creek. Populations are small and isolated, and it is assumed that these birds use adjacent BLM and private lands. This species was likely common in historical times within the Ecogroup area. Forest Service administered lands are believed to be important fall and wintering habitat for this species. Fall and winter habitats need to be dominated by tall shrubs other than sagebrush to meet wintering requirements. These habitats are referred to as mountain shrub communities and shrub-dominated riparian areas, and include the moderate and high canopy cover in Table W-3. An approximate even mix of the three canopy cover classes would be desirable within each occupied area through time. It is not known if these birds nest on National Forest System lands, but it is assumed that some likely do.

Table W-3 shows disturbed lands within one Management Area that likely do not meet wintering requirements of sharp-tailed grouse. These lands have low shrub canopy cover that would likely not protrude above the snow during winter. Historically the disturbed areas might not have been all wintering habitat with mountain shrub communities. In the five Management Areas that have grouse, National Forest System lands are a major contributor to wintering habitat. Disturbed areas include agricultural fields, areas dominated by annual vegetation, and urban areas.

Table W-3. Mountain Shrub Type Within Management Areas With Differing Canopy Cover Of Shrubs for Potential Wintering Habitat for Sharp-tailed Grouse
(McClure et al. In Press)

Management Areas	Acres of Potential Winter Habitat	Acres and % in Low Canopy Cover, < 10%	Acres and % in Moderate Canopy Cover, 11-20%	Acres and % in High Canopy Cover, >21%
11 - Rock Creek	24,080	1,680 acres 7%	7,180 acres 30%	15,220 acres 63%
13 - Trapper Creek/ Goose Creek	32,980	12,270 acres 37%	5,240 acres 16%	15,480 acres 47%
14 - Shoshone Creek	14,315	5,226 acres 36%	1,745 acres 13%	7,344 acres 51%
19 - Black Pine	14,410	10,089 acres 70%	4,321 acres 29%	140 acres 1%
20 - Sublett	11,870	120 acres 1%	2,470 acres 20%	9,390 acres 79%

Mountain Quail (*Oreoryx pictus*)
Mountain quail are found in dense shrub areas of coniferous forest and shrubby areas adjacent to meadows and riparian areas. They occur on the Boise and Payette National Forests on brushy, low-elevation mountain slopes. Mountain quail have steadily declined in central and southwestern Idaho over the last 30 years (Spahr et al. 1991). The cause of this rapid decline is unknown. Predation by feral cats is known to be a problem in areas near human habitation. Management of shrub cover adjacent to riparian areas needs to be considered as an important habitat feature of this species. There are no known population trends for mountain quail within the Ecogroup. Wisdom et al. (2000) estimate a reduction of 12 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU. There are no estimates of Mountain quail populations or habitats within the Ecogroup area, but they could be characterized as limited and rare.

Harlequin Duck (*Histrionicus histrionicus*)
The harlequin ducks observed on the Payette Forest are part of the Idaho-Wyoming population. The estimated breeding population in the Pacific Northwest is as follows: Washington-274, Oregon-50, Idaho-50, Montana-110, and Wyoming-40, for a total of 514. Harlequin's are present in these states during the nesting and brood-rearing seasons; they migrate to the coasts of

Oregon and Washington to winter. For nesting and brood rearing, these ducks require undisturbed, low gradient, meandering mountain streams with dense, shrubby riparian areas, and woody debris. They also need log jams and overhanging vegetation for cover and loafing areas.

Harlequin ducks have been observed along the East Fork of the South Fork of the Salmon River within the Payette National Forest. No nesting has been documented. Harlequin ducks have not been documented on the Boise and Sawtooth National Forests. Monitoring in Idaho and Wyoming indicate that populations are stable. Harlequins feed primarily on crustaceans, mollusks, insects, and small fish (Groves et al. 1997). For these migratory species, a change in population may not represent changes in habitat conditions on the Forests. Population may be influenced by activities off Forest, particularly in wintering areas. Logging in riparian areas may make these areas unsuited for this species. There are no known population trends for harlequin ducks on the Payette Forest, as they are believed to just pass through the area during migration to nesting areas in eastern Idaho or Wyoming.

Spotted Bat (*Euderma maculatum*)

Spotted bats forage nocturnally and feed mainly on moths in open ponderosa pine stands and meadows. They roost in cracks in steep rocky outcrops and cliff faces (personal comm. with L. Lewis 2000). This type of habitat does occur in some of the steep basalt canyons within the Ecogroup area. There has been no documented occurrence of spotted bats within the Ecogroup, but surveys have been limited. Spotted bats are known to occur in the southwestern portion of Idaho, south of the Snake River (Groves et al. 1997). This species is sensitive to human disruption during roosting and will abandon roost sites, which may increase mortality. There are no known population trends for spotted bats within the Ecogroup area. Wisdom et al. (2000) estimated a reduction of 18 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU.

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

Big-eared bats are nocturnal and feed primary on moths along forest edges. They roost in caves, old mines, and buildings. Maternity and hibernation colonies occur almost exclusively in caves and mine tunnels (Groves et al. 1997). Unlike other species of bats that seek refuge in crevices, big-eared bats group in clusters on open surfaces, making them more vulnerable to disturbance (Idaho State Conservation Effort 1995). Most of the big-eared bat records have been in lower elevations outside of large expanses of forest cover (Groves et al. 1997). This species is sensitive to human disruption during roosting and will abandon roost sites, which may increase mortality. There are no known population trends for the big-eared bats within the Ecogroup, but this species has been identified at several locations within the Ecogroup. Wisdom et al. (2000) estimated an increase of 20 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU.

Common Loon (*Gavia immer*)

The common loon is a large diving bird weighing 7-9 pounds. Like many other diving birds loons must run across the water surface to achieve enough speed to get airborne. Nests are made of mud and vegetation and are usually close to the shoreline in shallow-watered natural lakes without rapidly fluctuating water levels. Nests can be located on small islands that are mostly composed of emergent vegetation. Nesting usually occurs in early May just after ice breakup. Loons have a high fidelity to nest sites year after year. Loons avoid lakes with high levels of human activity, fluctuating water levels, turbid water, and no protective coves for nesting. These birds feed mostly on small fish such as yellow perch and various minnow species. Other aquatic organisms may also be consumed. Feeding occurs mainly under water (Spahr et al. 1991). Loons are not a high or moderate priority breeding bird species for Idaho Partners in Flight (IPIF 2000) in Idaho. Loons have been observed on some of the moraine lakes in Sawtooth Valley, but no nesting has been documented.

Spotted Frog (*Rana pretiosa*)

Spotted frogs are most often found near permanent water such as the marshy edges of ponds or lakes, in algae-grown overflow pools of streams, or in wet areas with emergent vegetation. They may move considerable distances from permanent water during rainy periods after breeding, often frequenting mixed conifer and subalpine forests, grasslands, and shrublands if puddles, seeps, or other waters are available. Spotted frogs are thought to hibernate in holes near springs or other areas where water remains unfrozen and is constantly renewed. The frog prefers a muddy or soft substrate in streams or ponds for hibernation (Spahr et al. 1991). They feed on invertebrates, generally close to ponds or standing water in riparian areas.

Spotted frogs have been documented on all three Forests in habitats that have standing or slow-moving water through the summer. Predation by bullfrogs, a non-native species, is thought to be a major reason for spotted frog declines. It is believed that populations of spotted frogs have also become fragmented and reduced in abundance because of introduced fish in systems that historically had no fish. These fish prey on both young and adult frogs. Alteration of riparian and wetland habitats is also an important management consideration for this species. There are no known population trends for spotted frogs within the Ecogroup, but they are commonly observed in areas of shallow standing water during the summer. Wisdom et al. (2000) did not evaluate source habitat changes for the spotted frog.

Management Indicator Species

Current Management Indicator Species

Management Indictor Species (MIS) can be selected for several reasons, one of which is, "…because their populations are believed to indicate the effects of management activities" (36 CFR 219.19(a)(1). By monitoring and assessing habitat conditions of MIS, managers can estimate effects on other species within similar habitats. However, monitoring of current MIS has indicated that some may not be good indicators for Forest habitat conditions and management activities. Some MIS were selected because they were thought to be good biological indicators, but monitoring has shown this not to be the case (see Preliminary AMS and Forest Five-year Monitoring Reports). Also, some of the MIS migrate off Forest to wintering areas and may be influenced by activities off Forest. For migratory species, a change in population may not represent changes in local Forest habitat conditions where they summer. Additional analysis and rationale for changing MIS is contained in the MIS process paper in Appendix F to the FEIS. Table W-4 has the current list of MIS for the three Forests.

Table W-4. Current Management Indicator Species of the Ecogroup

Type	Common Name	Forests with MIS
Mammal	Rocky Mountain elk	All 3
	mule deer	Boise, Sawtooth
	red-backed vole	Boise
	meadow vole	Boise
	mountain goat	Sawtooth
Bird	pileated woodpecker	All 3
	yellow warbler	Boise
	mountain chickadee	Boise
	Williamson's sapsucker	Payette
	vesper sparrow	Payette
	Lewis' woodpecker	Sawtooth
	Brewer's sparrow	Sawtooth
	sage grouse	Sawtooth
	Columbian sharp-tailed grouse	Sawtooth

Proposed Management Indicator Species

The proposed Management Indicator Species for Forest Plan revision are described below, along with reasons for their proposal.

Sage Grouse (*Centrocercus urphasianus*) - Within the Ecogroup area, sage grouse occur only on the Sawtooth National Forest, the southern end of the Boise National Forest, and adjacent BLM and private lands that contain habitat. The sage grouse is totally dependent on sagebrush/grassland vegetation to meet its habitat requirements. Some populations migrate long distances, some do not. Despite some wide-ranging annual movements, sage grouse have high fidelity to seasonal ranges for both nesting and wintering, and birds need extensive areas of native sagebrush/grassland year-round. Abundant native grass/forbs composition appears to be important within sagebrush-grassland communities during all life stages in the snow-free season. In summer, shrubs are used for cover, and grass and forbs are used as food, along with insects. During winter, sagebrush increases in importance because it protrudes above snow in wintering areas, and sagebrush leaves are used exclusively as food during the winter and early spring (Apa 1998, Braun 1998, Groves et al. 1997, IDFG 1997, Connelly et al. 2000).

Sage grouse statewide have declined 40 percent during the last 40 years. Populations in other western states and within the Ecogroup have shown similar declines (IDFG 1997). State Fish and Game, in cooperation with other agencies, monitor sage grouse population trends, usually annually. Sage grouse are hunted where they occur within the Ecogroup. Some organizations have petitioned this species for listing as a threatened or endangered species as recently as 2002, but the USFWS dismissed the petition as unwarranted. Because of habitat loss and population declines, the remaining habitat on Forest Service lands and adjacent ownerships is increasingly important to this and other sagebrush-dependent species. Population trends are improving in some locations, but are still reduced from the recent past. Because of its recent population declines, recent large fires that have modified habitat, its historical local habitat loss on other ownerships, and its status as a sagebrush obligate, the sage grouse is selected as a MIS for the Sawtooth National Forest.

Sagebrush/grassland in Idaho has changed greatly over the past 150 years. Much of the lower-elevation private areas supporting sagebrush have been converted to agriculture. Some of this conversion has made former habitats totally unusable by sage grouse and other sagebrush-dependent species. The extent of this conversion varies by location within and adjacent to the Ecogroup area. Some of this conversion has caused the remaining habitats to become fragmented, resulting in barriers to movement between populations (Apa 1998, Braun 1998, ICBEMP 1997c, Quigley and Arbelbide 1997b, Wisdom et al. 2000, Connelly et al. 2000). The overall quality of existing sage grouse habitat will likely become increasingly important as the quantity of these habitats continues to decrease due to modifications and development on non-federal lands.

The sagebrush communities that have not been converted to agriculture have also changed due to several factors, including livestock grazing, changes in fire regimes, road building, noxious weeds, and introduced livestock forage grasses (Apa 1998, Wisdom et al. 2000). Sagebrush has been treated on grazing lands by burning, plowing, chaining, disking, spraying, and seeding to increase livestock forage. These changes have occurred on public and private lands. These actions have changed the native sagebrush/grassland vegetation and are generally not beneficial to sage grouse habitat. Remnant sage grouse populations have become more dependent on native habitat remaining on and adjacent to the Forest Service and BLM administered lands (IDFG 1997, Quigley and Arbelbide 1997b, Wisdom et al. 2000).

Fires started by lightning historically modified the growth stages of sagebrush communities to the greatest extent. These fires cause sage grouse and other species to move into areas that did not burn, until sagebrush re-establishes itself in 10-15 years or more, depending on climate conditions. Livestock grazing increases successional rates, which results in dense shrub-dominated communities and a subsequent reduction in herbaceous understory. Fire exclusion has some of the same effects on sagebrush, increasing shrub densities and reducing herbaceous understory production. Another concern is the invasion of non-native plants that are not always used by native wildlife species. It is estimated that 16 species of non-native plants are a concern to sagebrush/grassland vegetation in the Ecogroup area, as well as to the wildlife species that are adapted to these plant communities.

Based on LANDSAT imagery, Table W-5 shows examples of differences in canopy coverage of sagebrush that likely have implications for sagebrush obligate species, including sage grouse. Shown are the 16 Management Areas that are known to have supported sage grouse populations in the recent past. It is believed that most of the sage grouse habitat within the administrative boundary of the Forest is used for nesting, brood rearing, and summering. Most of the wintering areas are on adjacent BLM, state, and private lands, but depending on climatic conditions, some wintering occurs within Forest Service administered lands.

Table W-5. Sage Grouse Habitat Within Management Areas With Differing Canopy Cover of Sagebrush (McClure et al. In Press)

Management Areas	Acres of Sage Grouse Habitat	Acres and % in Low Canopy Cover, <10%	Acres and % in Moderate Canopy Cover, 11-20%	Acres and % in High Canopy Cover, >21%
Lower South Fork Boise River (BNF)	7,897	1,750 acres 22%	2,161 acres 27%	3,985 acres 51%
Big Wood River	1,328	308 acres 23%	938 acres 71%	81 acres 6%
Little Wood River	2,073	490 acres 24%	1,500 acres 72%	84 acres 4%
Little Smokey Creek	2,443	20 acres 1%	1,388 acres 56%	1,036 acres 43%
Lime Creek	2,114	0 acres 0%	1,182 acres 56%	932 acres 44%
Soldier Creek/ Willow Creek	2,296	169 acres 7%	1,211 acres 53%	916 acres 40%
Rock Creek	40,343	5,795 acres 14%	20,060 acres 50%	14,488 acres 36%
Cottonwood Creek	10,079	1,851 acres 18%	4,187 acres 42%	4,042 acres 40%
Trapper Creek/ Goose Creek	46,193	21,850 acres 47%	13,677 acres 30%	10,665 acres 23%
Shoshone Creek	22,425	7,193 acres 32%	9,373 acres 42%	5,859 acres 26%
Albion Mountains	1,832	490 acres 26%	935 acres 51%	405 acres 23%
Howell Creek	377	81 acres 21%	178 acres 47%	118 acres 32%
Independence Lakes	537	284 acres 53%	194 acres 36%	59 acres 11%
Raft River*	5,279	4,035 acres 76%	569 acres 10%	675 acres 14%
Black Pine	6,134	3,568 acres 59%	1,310 acres 21%	1,226 acres 20%
Sublett	4509	326 acres 7%	2,604 acres 58%	1,579 acres 35%

*The acreage figures for the Raft River management area are not accurate because of lightning fires that burned approximately 2100 acres during the summer of 2002. These fires likely resulted in an increase of the 0-10 percent canopy coverage from the numbers displayed in Table W-5, with corresponding decreases in canopy cover percentages.

Canopy coverage of sagebrush is important to sage grouse in different ways. Most of the documented nesting of sage grouse occurs in sagebrush with canopy coverage of 15 to 25 percent (Apa 1998, Braun 1998, IDFG 1997). Sagebrush canopy coverage changes due to succession. Natural-occurring lightning fires have influenced succession rates and the extent of canopy coverage changes through time (see the Non-forested Vegetation section in Chapter 3 of the FEIS for a more complete explanation). Losses or changes of sage grouse breeding habitat or reduction in canopy coverage that exceed 40 percent of a large-scale area are detrimental to sage grouse (Connelly et al. 2000). These areas would equate to those within the less then 10 percent canopy cover in Table W-5. Based on this type of analysis, four management areas exceed the recommended threshold of greater than 40 percent in the 0-10 percent canopy cover within sage grouse habitat.

Guidelines to manage sage grouse populations and their habitats have recently been updated (Connelly et al. 2000). Based on these updated guidelines, no other management-controlled reduction should take place in the near term in these areas (Connelly et al. 2000). Wisdom et al. (2000) suggest that a loss or change in habitat of greater than 20 percent is significant and should be considered during proposed management activities. Additionally, there are areas within these management areas that contain sagebrush that are not habitat for sage grouse, but used by other species. Most populations use other ownerships adjacent to the Forest such as BLM, state and private lands. The condition and canopy cover of these other sagebrush habitat ownerships is unknown.

White-headed Woodpecker (*Picoides albolarvatus*) - A description of this species and its habitat needs and trends can be found in the Sensitive Species section, above. This species is being considered as an MIS for the Boise and Payette National Forests because of extensive habitat reduction, and the potential for additional habitat modification in the future. Because it is associated with relatively open ponderosa pine forests, the white-headed woodpecker is being considered as an MIS in selected management areas where that habitat occurs (1-16 on the Boise NF, and 1, 2, 3, 5, and 10 on the Payette NF).

Pileated Woodpecker (*Dryocopus pileated*) - Pileated woodpeckers occur on all ranger districts within the Ecogroup area, except the southern portion of the Sawtooth Forest. Habitat is mixed conifer forests, including spruce-fir and lodgepole pine, that are capable of growing large-diameter (>20 inches) trees with multi-storied stands. Pileateds nest in standing large-diameter snags, and are the largest woodpecker occurring within the Ecogroup area. Because pileateds are so large, they need snags of sufficient diameter to accommodate their body size when excavating nest cavities. Studies in Montana and Idaho have shown that old and mature larch, ponderosa pine, grand fir, and Douglas-fir are used for nesting. Dead and dying trees over time become snags, logs, and stumps that are important foraging sites containing carpenter ants. Pileateds also dig directly into anthills (Groves et al. 1997). Carpenter ants are the major food source used by pileated woodpeckers, and the ants must have dead trees, snags, and logs as habitat.

Fourteen other species of birds within the Ecogroup area are dependent on cavities that pileated woodpeckers excavate for nesting, because they are not able to excavate their own cavities. In addition to birds, mammals such as fisher, bats, and flying squirrels use the pileated cavities for nesting, denning and roosting sites (Bull et al. 1997, Quigley and Arbelbide 1997, Thomas et al. 1979, Wisdom et al. 2000). Because of their reliance on large-diameter trees and their importance to other wildlife species, the pileated woodpecker is proposed as an MIS for all three Forests.

There are limited surveys of population trends for pileated woodpeckers within the Ecogroup area. Wisdom et al. (2000) estimates an increase of 21 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU. The increase is believed to be the result of long-term fire suppression that has allowed the development of additional multi-storied stands and abundant dead trees, snags, and down logs for foraging sites.

The proposed management indicator species, their locations, and important considerations for management are described in Table W-6.

Table W-6. Locations and Management Considerations for Proposed Management Indicator Species of the Ecogroup

Type	Common Name	Forest*	Global Rank	PVG Occurrence+	Management Considerations
Bird	White-headed woodpecker	Boise and Payette	NA	1, 2, 3, 5	Snags, large trees with low crown density
	Sage grouse	Sawtooth	NA	Sagebrush - grass lands	Habitat reduction and alteration
	Pileated Woodpecker	All Three	NA	3, 4, 6, 7, 8	Snags, large trees with multiple canopies, and down logs

* Forest or Forests in the Ecogroup where this species occurs.
+ Potential Vegetation Groups or cover types that this species uses.
Global Rank = Globally imperiled ranking, from Idaho Conservation Data Center (2002)
NA = None available

Species of Special Interest

Rocky Mountain Elk (*Cervus elephus*)

Elk are not good biological indicators because of their generalized habitat needs. They were previously selected as MIS because they have a high social and economic value to the public, tribes, and state agencies in Idaho and Utah. For example, 1996 Idaho elk tag sales totaled $5.3 million dollars. This dollar amount does not include money elk hunters spent while hunting, which also contributes to the economic importance of this species to state and local communities.

Current populations of elk on the three Forests are estimated by Idaho Fish and Game and Utah Division of Wildlife Resources, even though the numbers of elk can change during the year. Elk populations are lowest during the winter after they migrate to lower-elevation winter ranges following the hunting season in the fall. Forest Service management actions—such as road construction, road obliteration, or vegetation management—can influence mortality rates during the hunting season. Additional mortality usually occurs on winter ranges, depending on the severity of the winter. The last several mild winters have contributed to current high elk numbers. Several predators take animals all seasons of the year, including wolf and cougar. Some winter ranges occur off Forest Service administered lands. Elk populations on the Forest are highest during the spring and summer, as elk migrate back from winter range areas and calves are born (Unsworth et al. 1993, Christensen et al. 1995, IDFG 1999).

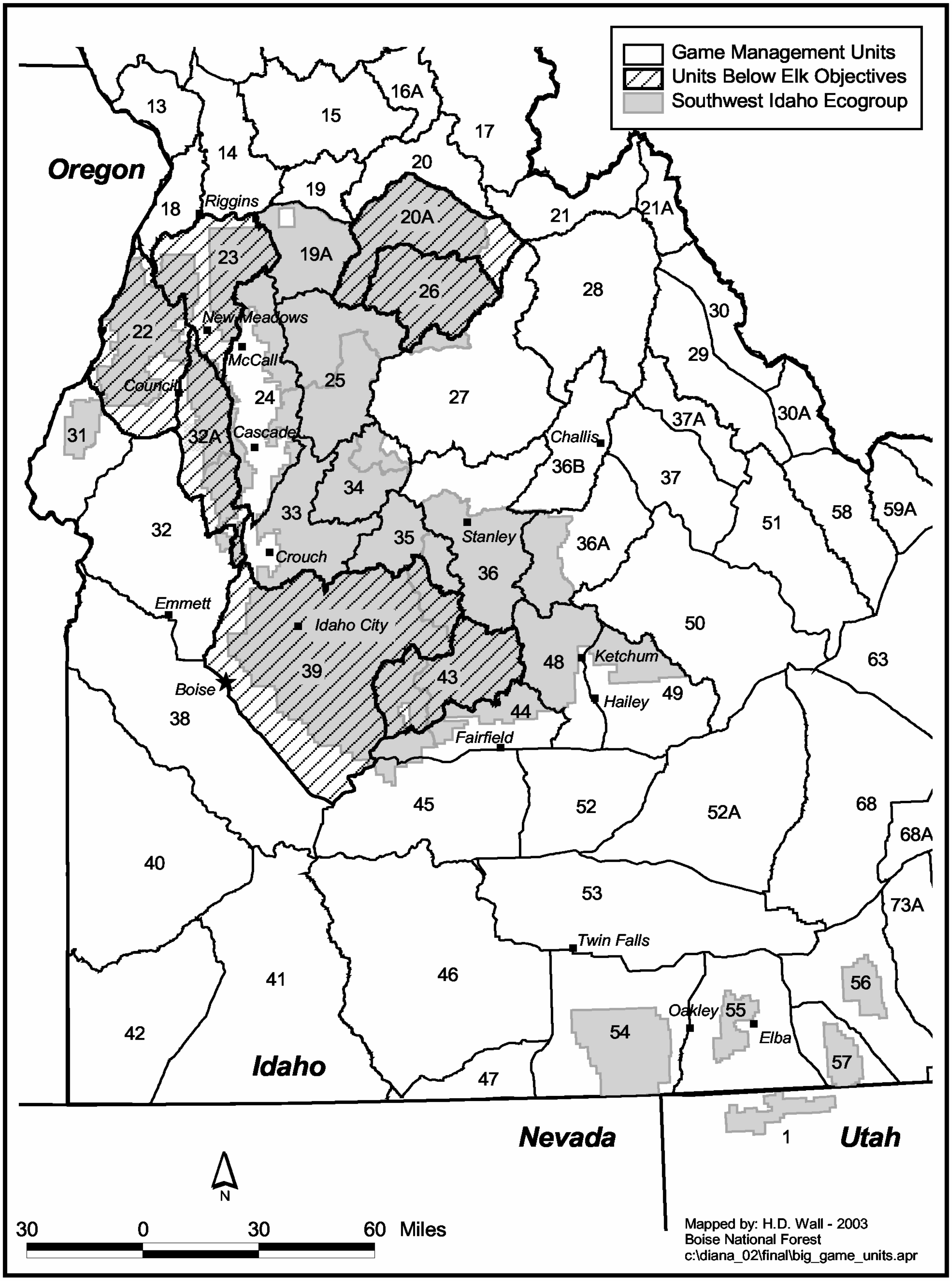
Elk and other big game within the Ecogroup are managed by the states of Idaho and Utah. Population and harvest goals are established within Big Game Management Units by the states with public participation. There are 27 big game management units within the Ecogroup, 26 in Idaho and one in Utah (see Figure W-1 and Table W-7).

Table W-7. Current Bull Elk Populations and Objectives for Idaho and Utah Big Game Hunting Units Within the Ecogroup Area

No.	Idaho and Utah Hunting Units	Current Bull Population Estimates	State Adult Bull Population Objectives	Meeting (M) Not Meeting (N) Exceeding (E) Objectives	Percent of FS Administered Land within Hunting Units
1	19A - Idaho	131	100-150	M	94
2	20A	130	150-250	N	99
3	22	91	125-200	N	55
4	23	119	125-175	N	62
5	24	0	0	N/A	42
6	25	154	75-125	E	98
7	26	100	150-200	N	98
8	27	389	300-450	M	99
9	31	72	50-100	M	18
10	32	128	40-60	E	1
11	32A	19	75-125	N	58
12	33	354	300-450	M	83
13	34	0	0	N/A	98
14	35	37	25-75	M	99
15	36	34	30-50	M	95
16	36A	353	200-300	E	51
17	39	119	375-575	N	59
18	43	223	275-400	N	94
19	44	129	30-50	E	36
20	45	150	35-50	E	1
21	48	176	75-125	E	69
22	49	531	300-400	E	27
23	54	5	1-5	M	34
24	55	5	1-5	M	12
25	56	50	20-30	E	17
26	57	5	1-5	M	32
27	1a - Utah	N/A	275	N/A	33

NA = Not Available

Figure W-1. Idaho and Utah Game Management Units and the Ecogroup Area



All of these management units contain elk, but some of the populations are limited to the extent that no hunting season occurs. Some of these Fish and Game units are totally within the Ecogroup Forests, and some only have small portions that are within the Forest administered lands.

Based on research conducted in Idaho and other western states, the major factor contributing to elk mortality is hunter harvest during hunting season (Unsworth et al. 1993). Elk vulnerability is defined as a measure of elk susceptibility to being killed during the hunting season (Christensen et al. 1995). Elk vulnerability is an important component of the State Fish and Game Department's management goals and objectives.

Elk Vulnerability models (Unsworth et al. 1993) have been proposed as a predictive tool managers can use to predict mortality rates and monitor elk vulnerability. Research conducted by the Idaho Department of Fish and Game and the University of Idaho provides the basis for this elk vulnerability analysis (Unsworth et al. 1993, Christensen et al. 1995). For the Forest Plan Revision, two parameters were suggested to be useful for elk vulnerability analysis:

- Hunter-day densities (measured in total hunter-days per square mile on a watershed basis).
- Motorized road and trail densities and cross-country motorized access (measured in miles per square mile on a watershed basis).

The number of hunter-day densities is influenced by the number of permits issued by the state agencies and the ease of access. State wildlife agencies have control over the number of permits issued and the length of the hunting seasons.

Forested vegetation is also an important consideration for management of elk populations during the hunting season (Christensen et al. 1993, Hillis et al. 1991, Lyon 1983, Lyon and Canfield 1991). Forested vegetation is modified during management activities for many reasons; elk security area needs should be one consideration if state elk population goals are to be achieved (Christensen et al. 1993).

Elk vulnerability analysis could be used to predict percent mortality of bull elk during the general antlered elk rifle hunting season, which usually occurs in the months of October and November (Christensen et al. 1995). Access management in selected locations to restrict motorized travel during the hunting season is occurring on all three Forests currently. Most State Fish and Game Units contain roads that traverse multiple ownerships of federal, state, and private lands, so that access management must consider these other ownerships. State Fish and Game agencies monitor elk populations annually. Overall, elk populations statewide are currently near all-time highs, indicating that no major habitat limitation is currently present, which seems to be the situation within the Ecogroup as well. Hunter harvest statewide during the 1999/2000 hunting seasons was near a record level. Within the Ecogroup area, state agency elk population objectives are shown in Table W-7.

Forest Service administered lands contribute significantly to the elk population and hunter opportunities within the Ecogroup area. With the current high population levels, present habitat conditions do not appear to be limiting the populations within the Ecogroup area, though mature bull vulnerability may be a concern in some areas. Seven of the 27 Big Game Management Units are currently below state objectives for estimated bull populations, while eight are above.

Bighorn Sheep (*Ovis canadensis spp.*)

Bighorn sheep populations have greatly declined in the Ecogroup. Based on historical records, bighorn sheep were common on all three Forest 100-150 years ago. Since then, habitat and populations have become small and fragmented (Wisdom et al. 2000). Bighorns currently occur as small, isolated populations on the Sawtooth and Payette National Forests. Some of these populations are recent transplants by State Fish and Game agencies. Numbers are estimated at several hundred animals on the two Forests, though habitat is available for larger populations.

Although these species have no status under the ESA, the USFWS is concerned about their population status and threats to their local viability (Quigley and Arbelbide 1997c). One threat is the risk for disease transmission from domestic sheep (Quigley and Arbelbide 1997c, Wisdom et al. 2000). Prevention of disease transmission between domestic and wild sheep is an important management concern [36 CFR 219.20(b)].

Bighorn populations currently occur in five general geographic locations: the Cassia and Albion areas and White Cloud Mountains on the Sawtooth; and Hells Canyon and the Salmon River Canyon on the northern portion of the Payette Forest. Only the Cassia Division and Hells Canyon areas have a significant threat of disease transmission from domestic sheep. These two areas account for an estimated 200,000 acres (see Figure F-5, Appendix F for general locations).

Bighorn sheep populations that are small and isolated, such as the recently transplanted individuals, can suffer significantly from predation as well as disease transmission concerns. This situation has occurred on the southern portion of the Sawtooth National Forest during the last ten years, where predation losses have been known to be high within these small populations. Areas referred to as "bighorn sheep emphasis areas" were identified by state wildlife agencies as high priority habitat for wild sheep.

In the Hells Canyon area, disease transmission between domestic and wild sheep is a greater concern. Domestic sheep grazing in Oregon within the Hells Canyon NRA have been greatly reduced during the last 20 years, and this has allowed for the expansion of bighorn sheep herds in Oregon. Currently bighorn sheep in Oregon are crossing the Snake River into bighorn sheep habitat in Idaho, which was not anticipated. Once in Idaho, these sheep may come in contact with domestic sheep because domestic sheep allotments occur on the Payette National Forest in the Hells Canyon area of Idaho. The concern is that these bighorn sheep can return to Oregon and potentially infect a large and extensive bighorn sheep population that occurs on the Oregon side of Hells Canyon. In situations where domestic sheep and bighorn sheep come in direct contact, bighorn sheep almost always die from infections, whereas domestic sheep are unaffected.

To deal with this concern in the Hells Canyon area, Idaho, Oregon, and Washington state wildlife agencies and other interested organizations have assumed the responsibility for bighorn sheep losses and further disease transmission in their respective states. These three state wildlife agencies and others formed the Hells Canyon Bighorn Sheep Restoration Committee in 1997 to address the disease transmission issue in Hells Canyon area. Currently they have a process to deal with bighorn sheep crossing the river between Oregon and Idaho that have come in contact with domestic sheep.

Snowshoe Hare (*Lepus americanus*)

Forest plant communities that provide snowshoe habitat are subalpine fir, Engelmann spruce, Douglas fir and lodgepole pine. Within these types, tree density and understory vegetation are the important components. Snowshoe hare have a strong preference for microhabitats of young, dense tree seedlings and saplings that provide protective understories composed of edible shrubs and tree limbs. The dense small-diameter trees and shrubs help protect the hares from predators and harsh winter weather. During the winter, food for snowshoe hares is limited to twigs and stems that are within reach above the snow surface. The large feet of snowshoe hare enable the animal to traverse deep snow easily. It is not known what constitutes habitat for snowshoe hares in terms of patch size and spatial arrangement of patches (Ferron et al. 1989).

Snowshoe hare habitat is influenced by forest management practices such as timber harvest, thinning, brush control, fire use, fire suppression, and snow compaction (Wisdom et al. 2000). Snowshoe hares are the primary winter food source for lynx, an ESA listed species. It is assumed that habitat quality and quantity have decreased due to past management activities such as thinning and fire exclusion that have reduced the extent of early seral forest plant communities over a extensive area of the Ecogroup that coincides with lynx habitat (USDI FWS 2000).

Habitats/Species of Birds At Risk

Several groups, organizations, and agencies monitor wildlife species and their habitats and make recommendations concerning their conservation to land management agencies and interested publics. One such organization is Idaho Partners In Flight (IPIF), which is concerned about the viability of bird species because of habitat alteration and loss, or direct impacts to the species. They have identified four priority bird habitats in Idaho for restoration and conservation: (1) riparian; (2) marshes, lakes, ponds; (3) sagebrush; and (4) ponderosa pine. These four habitats were selected because they are the most altered by past and present human activity in Idaho (IPIF 2000).

The four priority habitats support 35 at risk bird species that breed in Idaho (see Appendix F). Within the Ecogroup area, an estimated 27 of these 35 species are breeding in these priority habitats (IPIF 2000). Some of these species are year-round residents, and others are migratory. The birds that are migratory may be having problems (habitat loss, pesticides poisoning, harvest) on their wintering areas outside of Idaho. A change in abundance for these species in Idaho may not relate directly with habitat conditions in Idaho. Habitats in Idaho that have significantly changed, reduced, or altered may affect species dependent on these habitats.

Riparian Habitats - In Idaho, 113 species are known to use riparian areas for nesting. Within the Ecogroup, riparian habitats are believed to support 14 priority bird species at risk. Riparian habitats account for a very small portion of land area (about 2 percent), but support additional species besides birds. The willow flycatcher will be used to analyze potential effects on non-forested riparian habitats. Effects on forested riparian habitats will be analyzed for the fisher, a Region 4 sensitive species.

Marsh, Lake, and Pond Habitats – In Idaho, 77 bird species are known to use these types of habitats for nesting. These habitats feature standing water, and within the Ecogroup they are believed to support five at risk bird species. These habitats occupy an even smaller portion of the Ecogroup than riparian areas, most likely under one percent. Water bodies such as reservoirs usually do not meet the needs of many of these species because the draw down of water for irrigation or power production reduces the quality of shoreline habitats. Marsh, lakes and ponds that have not had their hydrologic regime modified (increased, decreased, modified) provide the best habitat. Because these habitats are such a small portion of the Ecogroup area, and because they are strongly protected by both Forest Plan management direction and legislation (Executive Order 11990), no significant effects are anticipated from any management alternative.

Sagebrush/Grassland Habitats - In Idaho, about 100 species are known to use sagebrush habitats. Within the Ecogroup, these habitats support as many as eight priority bird species. Many of these species are totally dependent on sagebrush habitats. The sage grouse, a proposed management indicator species for the Ecogroup, will be analyzed to show potential effects on these habitats.

Ponderosa Pine Habitats - In Idaho, 31 species breed in this type of habitat. Within the Ecogroup, these habitats support two priority bird species at risk, the white-headed woodpecker and pygmy nuthatch. The white-headed woodpecker, a Region 4 sensitive species and the pileated woodpecker, a proposed MIS for the Ecogroup, will be analyzed to show potential effects on these habitats.

Habitats in Idaho that have significantly changed, reduced, or altered may affect species dependent on these habitats. Wisdom et al. (2000) believe a loss in habitat of 20 percent is significant, and habitats that have experienced such loss need special consideration. Selected species from those identified at risk identified by Wisdom et al. (2000) that occur within the Ecogroup area have also been evaluated (see Terrestrial Technical Report 2003).

The USFWS has developed a list of species (Birds of Conservation Concern) relative to the MBTA, but an MOU between agencies has not been finalized on how to address these species (USDI FWS 2002). A Birds of Conservation Concern list of species that may occur in the Ecogroup area is displayed in the Terrestrial Technical Report 2003.

Snags and Down Logs

Snags and coarse wood are important habitat consideration for many species. Within the Ecogroup area, sixteen species of birds and nine species of mammals are dependent on snags to meet some part of their life stage (Wisdom et al. 2000). See the *Vegetation Diversity* section for a discussion of the effects to snags and coarse wood components. Effects of the alternatives on the snag and log components of terrestrial habitat will be analyzed for those representative species of concern that are dependent on snags or down logs for nesting, denning, or foraging habitat. These species include lynx, fisher, white-headed woodpecker, northern three-toed woodpecker, boreal owl, flammulated owl, great gray owl, and northern goshawk.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Laws, Regulations, and Policies - Congress has passed legislation to protect and manage wildlife resources, which influences the Forest Service's authority and compliance for management of wildlife resources on their administered lands. Some of the major laws are: Bald and Golden Eagle Protection Act, Sustained Yield Forest Management Act, Sikes Act, Multiple Use-Sustained Yield Act, National Environmental Policy Act, Endangered Species Act, Migratory Bird Treaty Act (MBTA), Federal Land Policy and Management Act, National Forest Management Act, Executive Order 11990 – Protection of Wetlands, Forest and Rangeland Renewable Resources Research Act, Public Rangelands Improvement Act, Fish and Wildlife Conservation Act, Federal Cave Resources Protection Act, and North American Wetlands Conservation Act.

These laws are interpreted into National and Regional regulations and policies to help federal agencies follow the intent of the laws. Regulations and policies developed from the laws that most influence the management of Forest wildlife resources are 36 CFR 219.19 Planning regulations, 1500 NEPA regulations, and the 2500 and 2600 sections of Forest Service Handbook and Manual direction. Agency direction, in turn, influences finer-scale analysis, biological assessments, inventories, and monitoring. The intent of these fine-scale implementation activities is to make better management decisions based on local information to maintain or improve habitats for species with identified concerns.

Forest Plan Direction – Forest Plan direction for all action alternatives is designed to maintain or improve conditions for habitats/species with identified concerns. Direction occurs at both the Forest-wide and Management Area levels. Goals and objectives have been designed to move toward or achieve desired conditions to maintain or restore habitats and processes needed over the long term by species. Standards and guidelines give additional direction to protect or restore conditions for habitat/species that could be negatively affected by other land management activities. Other resource programs also implement additional direction and guidance for resource protection in an integrated manner to maintain or restore desired conditions.

The Forest Plan revision effort developed alternatives (except 5 and 1B) that have desired conditions for vegetation that strive to be within the bounds of the Historic Range of Variability (HRV). If management activities can produce conditions that are within HRV, then it is assumed that the species that adapted to these conditions will have sufficient habitat to meet their needs. The potential to diminish biological diversity is high if current and anticipated conditions are outside of, and remain outside of, the HRV (Morgan and Parsons 2001). Desired conditions (Appendix A to the Plans) also describe structural stage condition of forested communities that should provide the ecological representation needed to maintain their associated species.

Wildlife considerations were one of the main drivers for determining desired conditions during the modeling of forested vegetation. To meet the needs of many terrestrial species, emphasis was on maintaining or restoring the amount of large trees on the landscape. A 20-percent large-tree desired condition became the management constraint to meet species viability in forested communities during modeling in all alternatives except 1B, where 10 percent was used to reflect current plans. Several studies (see technical report) have found that a 20 percent large tree condition will meet the habitat needs for goshawk and other species such as the white-headed woodpecker, pileated woodpecker, and fisher. It was assumed if goshawk habitat was maintained and developed, the varied prey that goshawks require would also be maintained. Goshawks are known to occur on all Districts in the Ecogroup, are a top predator that use all PVGs, and have a large home range of 3,000-6,000 acres. The 20 percent large tree component described above was further validated through analysis of nest sites on the Minidoka Ranger District on the Sawtooth National Forest. The analysis found that old forest within 500 acres of 15 active goshawk nests averaged 20 percent.

The original Forest Plans tied a desired amount of "old growth" to the needs of a single species. The amount of "old growth" required varied between 5 and 10 percent in the three (Sawtooth – 1987, Payette – 1988, Boise – 1990) Forest Plans. Ten percent old growth was suggested by Thomas et al. (1979) to maintain several species over the landscape that are adapted to large trees. Revised Forest Plan direction recommends a 20 percent large tree component to maintain biological diversity for a host of species (Fahrig 1997, Graham et al. 1997, Graham et al. 1999, Graham and Jain 1998, Reynolds et al. 1992). The large tree component was used instead of old growth because wildlife habitat is mainly a product of the vegetative structure of a community and not the age of the vegetation. Large trees are not always old, and old trees are not always large (Thomas et al. 1979).

The main reason for the differences between large tree percents and old growth percents is that vegetation structural conditions in central Idaho develop in conjunction with disturbance processes (fire, insect, disease, wind, etc.) and climate variations. Conversely, late successional old growth characteristics develop in the absence of frequent disturbances (Hamilton 1993). In central Idaho, disturbance is a common occurrence. In historical times, forested stands in lower-elevation vegetation groups likely developed large trees and relatively open canopies during mid-successional stages, and these conditions were maintained over time by frequent low-intensity fire disturbance. Dense stands and decadence typically associated with late successional stage conditions (old growth) rarely occurred. Thus, historical stands dominated by large and old seral trees like ponderosa pine could be considered old forest, but not as "old growth" under any definition that incorporates a full set of late successional conditions.

As Mehl et al. (1998) point out:

> "Specific measures of old growth characteristics have not been developed for the understory fire maintained systems. The large tree vegetation growth stage within the understory fire regime is a fire maintained system that is usually dominated by seral species in a late growth stage. However, if species composition and tree densities meet the requirement of the understory fire/large tree vegetation growth stage, it is likely to closely represent "old growth" conditions, as we currently understand them. The overall point being that old growth forest and climax forest can be different entities".

The RELM model was also used to help achieve the "well distributed in the planning area" requirement for wildlife habitat. Using RELM, a five-decade analysis was created for each alternative that spatially displays the distribution of the large tree desired conditions. The RELM model uses SPECTRUM solutions for the first five decades to pro-rate solutions to subwatersheds using Geographic Information System (GIS) technology.

Forest Plan Implementation - Project implementation under the umbrella of Forest Plan direction includes analysis based on current and more site-specific information about existing conditions where actions are proposed. Proposed projects collect more accurate resource information for the local area. Historical conditions, current conditions, and desired conditions are analyzed at a finer scale of resolution to better predict project outcomes. Biological evaluations and assessments, providing a more detailed analysis of potential effects, are required for listed or species of concern. A determination of effects for any listed or proposed species would also have to be made for any future project under the direction of the revised plans.

General Effects

The following is a description of general effects to wildlife habitat or species from other resource management activities. Although the amount or distribution of these activities may differ by alternative, the general types of effects from the activities would be the same for all alternatives.

Timber Harvest – Timber harvest activities alter vegetation components that comprise habitat for almost all terrestrial species. Harvesting can change vegetation composition, density, size, amounts and distribution, and move successional trend toward or away from HRV. These changes in vegetation can have positive or negative effects on different species. For example, past selective harvesting of large seral species is detrimental to species such as the white-headed woodpecker that depend on large trees and snags, but may be beneficial for other species like vesper sparrow that prefer open, brushy habitats. Post-fire salvage logging can reduce the amount of large trees or snags used by cavity-nesting species that have evolved with fires where trees were not removed.

The mechanical processes involved in timber harvest produce disturbance to wildlife because of equipment use or human presence. In areas where roads are built and maintained for long-term use, vehicle access can increase threats to some wildlife species. Snags are usually removed adjacent to roads for safety reasons, and roads provide ready access by people wanting firewood. This reduces the habitat for species that require snags/logs. The timing of activities can also have different effects. For instance, localized harvest activities may disturb elk calving during a relatively short period in the spring, but not at other times of the year.

Potential effects to wildlife habitat and species from timber harvest and associated management activities will vary by alternative theme and management prescription (MPC) assignments.

Fire Management – Fire management activities change vegetation. Fire use or exclusion of fire can change vegetation composition, density, size, amount, and distribution of both live and dead material, as well as successional trends. Wildland fire can also have these effects.

Long-term fire exclusion causes an increase in vegetation quantity above levels that were historically present. In white-headed woodpecker habitat, this has caused a reduction in habitat quality because of increasing tree density and higher composition of shade-tolerant trees. Long-term fire exclusion in the same type of habitat has benefited species such as the pileated woodpecker, which prefers multi-storied tree stands and abundant snags and logs for feeding sites. The timing of fire can also have different effects. Historically, fire created disturbance that altered vegetation at fairly regular intervals and intensities that varied by PVG. Vegetation and animals evolved with fire being a common occurrence in the environment. The changes in vegetation resulting from fire can have positive or negative effects on different species depending on the fire intensity, frequency, and timing.

Alternatives vary in the trade-offs of fire risk to vegetation change. Potential effects to wildlife habitat and species from fire management will vary by alternative theme and MPC assignments.

Livestock Grazing – Grazing livestock compete with wildlife for the use of available forage. Grazing results in plant defoliation, mechanical changes to soil and plant material, and nutrient redistribution. These and other factors also influence successional trends. Succession is affected by the grazing frequency (times grazed), intensity (amount of plant removal), and opportunity (time the plant needs to meet its physiological growth needs). Timing (spring, summer, fall) of grazing can also have different effects on vegetation, such as a reduction of flowering parts, or physical damage to plants if conditions are to wet in the spring. Grazing can alter the density and composition of herbaceous and shrub vegetation. Vegetation is sometimes altered to increase forage for livestock. Even the very presence of livestock can affect some wildlife species. For example, cattle attract cowbirds in open forest settings. Cowbirds lay their eggs in the nest of other birds. Cowbird chicks out-compete the young of other species, and force them out of the nest, usually resulting in death. The presence of livestock may be giving cowbirds an ecological advantage over other bird species in the area.

Grazing by domestic sheep can increase the risk of disease transmission to bighorn sheep. Bighorn sheep are highly susceptible to some strains of *Pasteurella* that are carried by domestic sheep. The disease, which does not affect domestic sheep, is usually fatal to bighorn sheep. Transmission of the disease can occur when bighorn sheep and domestic sheep occupy the same area and come in physical contact with each other.

Road and Trail Construction and Use –The majority of roads constructed on national forest lands over the last 50 years have been developed primarily for timber management activities. Historically, trails were developed for livestock management activities, mining, and fire lookout access. More recently however, trails have also been constructed for recreational activities.

Roads and trails remove vegetation from the travel surface. This removal directly reduces the amount of vegetation that can be used as habitat, and indirectly affects adjacent habitat. The relative effects of roads on wildlife depend on the interactions of topography, vegetation type and condition, and frequency of human use. One of the primary direct effects is increased human access in to areas. Increased access increases mortality risk, fragmentation of habitat, and displacement/avoidance responses. Access can increase the risk of non-native plants becoming established, and many of these plants are not used as habitat or forage by native species. Access on roads and trails can be restricted during certain times of the year to reduce or eliminate the effects of access.

The increasing human population trend for this region is likely to continue, and this growth will likely increase human use of public lands during all seasons of the year.

Minerals Management – Mining exploration and development can influence wildlife in a number of ways, including road construction to mineralized areas, increased human interaction, and loss of vegetation that was used as habitat. Mining in the past has not influenced extensive areas, but can result in considerable changes to landscapes where it does occur. Some of the first roads constructed were to gain access to mineral deposits. Mining operations have different needs for the extent of support facilities and access. In areas where mineral reserves justify the construction of a mill, impacts may include buildings, equipment, utilities, tailings, and human presence. Generally, mining operations that use tunnels influence less surface area then open pit technology.

The scale of mineral development has differing effects on habitat and displacement/avoidance associated with the extent, timing, and duration of activities. Exploration activities are usually short term, while mineral production can displace wildlife for many years in some cases. Some mining activities use or produce toxic material. If improperly handled, this material can cause mortality to wildlife.

The effects to habitat and species will not vary between alternatives. The ability to access minerals would not change by different alternatives. Mineral development is a function of worldwide market values that are unaffected by different alternatives or MPCs. Areas can be withdrawn from mineral exploration or development by Congress or administratively. There are no proposals to directly withdraw any areas through plan revision, although land allocation decisions (recommended wilderness, eligible Wild and Scenic Rivers) made during revision could indirectly influence mineral withdrawals in the future, depending on Congressional action.

Recreation – Recreation is a function of social demands related to experiences desired, available and provided on Forest Service administered lands. Developed and dispersed camping can decrease the habitat capability for some species. Wildlife species that require snags are usually negatively affected by hazard tree removal for safety reasons and the desire for firewood. Long-term use of dispersed sites can modify the vegetation that wildlife species depend on. Wildlife disturbance or disruption from recreation during breeding/nesting periods can also occur.

Winter recreation, such as cross-country skiing and snowmobiling, can stress wintering animals during deep snow periods. Over-the-snow trails allow access for some animals to areas they usually cannot use during the winter because of deep snow conditions.

Alternatives with different recreational emphasis would likely change the distribution and amount of recreational activities. The increasing human population trend for this region is likely to continue. Likewise, the desire by the public to meet their expectations for differing recreational activities will continue to increase. This increase in recreation use has resulted in increased conflicts with wintering wildlife, particularly big game. Most big-game winter ranges have access restrictions to reduce stress during periods of deep snow; additional restrictions for big game winter ranges are not anticipated.

Non-native Plants – Over time many non-native plants have been introduced into the Ecogroup area. Some plants were intentionally introduced; others were not. Non-native plants change the value of wildlife habitat by displacing native plant species. Some non-native species are not usable by native wildlife species as habitat or forage, and their presence decreases the habitat carrying capacity. Some non-native plants influence the fire regime and create conditions that may cause areas to burn more frequently. The increasing frequency of fire can cause a reduction in woody species that are valuable as habitat. Additionally, non-native plants compete with native vegetation for moisture, nutrients, and space, all of which can reduce habitat quality and quantity. Some non-native plants are considered "noxious weeds" by the state. Programs are in place to reduce the spread of noxious weeds, but these programs have had mixed success. All alternatives would treat noxious weeds, but some may be more successful than others due to variable factors such as access, detection, and vectors of establishment and spread (see *Non-native Plants* section in this chapter).

General Effects by MPCs

Vegetation Management with Emphasis on Restoration (MPCs 3.2, 5.1, and 6.1) - Wildlife habitats are anticipated to improve over the long term because of the emphasis on restoration of habitats with these prescriptions. Habitat would benefit because of an emphasis on road obliteration, mechanical vegetation treatments, and fire use to manage vegetation toward HRV conditions. Other resource activities are allowed as long as plant species composition and structure achieve sustainable resource conditions and ecosystem health. The need for resource mitigation activities for wildlife habitat would be minimal where management activities occur.

Vegetation Management with Emphasis on Commodity Production (MPCs 5.2, 6.2) – Wildlife habitats are anticipated to improve because of required protection measures and restoration activities associated with commodity production projects, but impacts may occur in the short term before improvements occur. The use of fire in forest vegetation would be the most limited, and this would make it harder to achieve habitat conditions needed for some species. Large tree, snag, and down log management requirements would be at threshold levels where intensive management occurs. Road construction and use would be at highest levels, which would have adverse impacts to species that are sensitive to disturbance. Mitigation activities are major elements of most project activities with these MPCs.

Natural Processes Dominate (MPCs 1.1, 1.2, 2.2, 3.1, 4.1) - Wildlife habitats are anticipated to improve by natural process, with succession and disturbance being emphasized. Restoration of habitat will occur, but may take the longest time frame to achieve, because of an emphasis on unpredictable natural processes. Species that are most negatively affected by mechanical disturbance and other human activities would benefit from these prescriptions.

Viability Analysis

This analysis looks at how the management alternatives for Forest Plan revision either contribute to or mitigate changing patterns of habitat alteration and fragmentation, and disturbance to wildlife. Particular attention is paid to those species whose viability may be of concern and affected by the alternatives and their associated activities. Federal planning regulation 36 CFR 219.19 requires that viable populations of all native and desirable non-native vertebrate species be maintained at the planning area level. Species with a viability concern include those listed or proposed for listing under the Endangered Species Act, those on the Regional Forester's sensitive species list, Forest selected Management Indicator Species for which populations and habitat conditions may be a concern and other species identified that may be at risk at a more local level.

There is no approved or standardized approach for viability analysis, and the debate continues at the national level. Several different recent approaches (Andelman et al. 2001, Holthausen et al. 1999) have been considered in this analysis. A caveat that should be noted is that each species has a unique response to environmental conditions and changes in those conditions (Landres et al. 1999). The very presence of a species is indicative of its persistence in an environment, but species are generally tolerant of a range of environmental conditions, resulting in increasingly complicated predictions when using a model (Haufler et al. 1996). All viability analysis approaches have limitations and risks involved because of incomplete species and habitat information, lack of data precision, environmental uncertainty, potential natural catastrophic events, and the uncertainty associated with future projections (Holthausen et al. 1999).

Direct and Indirect Effects by Alternative

Endangered and Threatened Wildlife Species

Special consideration for management proposals at the project level is given to species listed under the Endangered Species Act (ESA). Biological assessments are completed that identify possible effects to these species. The assessments determine how well management alternatives maintain or improve habitat conditions for these species of concern. Potential effects at the Ecogroup and Forest scales are described below for species currently listed under the ESA.

Gray Wolf (*Issue 2)* - Because wolves are habitat generalists that hunt and den over a wide variety of vegetation types, the alternatives would not have significant effects on the amount and distribution of habitats used by wolves or their prey species. Gray wolf populations are primarily limited by non-habitat factors such as denning disturbance and direct interaction with humans that cause mortality. Most of the known wolf mortality that has occurred in the Ecogroup has been in response to livestock depredations. Wolves that have a history of livestock depredations are lethally controlled by agents of USDA, APHIS Wildlife Services. Most of the depredation problems have been on or near the Sawtooth National Forest within the Central Idaho Recovery Area.

Wolves are most vulnerable to disturbance while denning and rearing pups. Forest-wide management direction has been designed to allow wolf pairs to establish dens and packs on the Forest if they choose to do so, under the protection of the Experimental/Non-essential population rule in Idaho (USDI FWS 1994). Activities that disrupt wolves during denning and pup rearing are prohibited near wolf dens during the spring denning and rearing period under all alternatives until six (6) breeding pairs are obtained. Additional management direction will contribute to viability and persistence of this species within the Ecogroup area, including northern Utah.

Wolf interaction with humans is perhaps most influenced by human accessibility to remote habitats. Under all alternatives, the amount of roads across the Ecogroup is expected to decrease over the short term (10-15 years), although small amounts of new road construction would also occur. Based on proposed vegetation management opportunities, Alternative 3 would reduce roads the most, followed in order by Alternatives 2, 7, 4, 5, 1B, and 6 (Table W-8).

Table W-8. Ecogroup Average Road Miles Related to Vegetation Management Opportunities by Alternative, Average of First Two Decades

Road Miles	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt.7
Decommissioning	54.2	82.1	109.6	44.3	63.7	24.3	63.6
New Construction	25.7	28.9	21.4	5.4	30.9	2.7	22.2
Net Differential*	- 28.5	-53.2	-88.2	-38.9	-32.8	-21.6	-41.4

*Calculated by subtracting new road construction from road obliteration

Additional roads would likely be obliterated or closed depending on protection and restoration needs and funding available from other resources such as soil, water, fish, and wildlife. The reduction in roads would have the indirect effect of reducing the likelihood of adverse human interaction with wolves in the form of shooting, harassment, vehicle collisions, and other forms of threats. Road reduction would likely continue over the long term in gradually diminishing amounts until the Forests have transportation systems that achieve a more desirable balance between access needs, resource impacts, and effective road maintenance capability.

Another way to assess inaccessibility is to calculate the amount of acres that would be generally regarded as roadless under each alternative. Areas without roads are typically represented by management prescriptions for Designated Wilderness (1.1), Recommended Wilderness (1.2), Research Natural Areas (2.2), and Semi-primitive Recreation (4.1a). These areas would also have either no motorized recreation or relatively low levels. Acres for these areas are presented by alternative in Table W-9, below.

Table W-9 indicates that Alternative 6 would have the most areas without roads, followed in order by Alternatives 4, 7, 1B, 2, 3, and 5. For all alternatives, areas without roads would represent a substantial percentage of the overall Ecogroup area; however, Alternative 6 would have almost three times as much area in a roadless condition as Alternative 5. Forest-wide direction will implement access restrictions if breeding pairs drop below the objective of six (6) breeding pairs as directed by the special rule.

Within the Central Idaho recovery area, wolves are increasing and exceeding the recovery goals numbers and time frames under current conditions. Increases are occurring despite mortality due to lethal control actions on individual wolves that have a history of livestock depredation. Current estimates within the Central Idaho Recovery area of wolf numbers for 2002 are 19 packs, 10 breading pairs, and 282 individuals. Before this species can be de-listed, the States of Idaho, Wyoming, and Montana must have an approved wolf management plan in place that is approved by the USFWS. No alternative is anticipated to reduce the prey abundance for wolves. Currently elk are at all time high populations levels state-wide and believed to be a primary prey of wolves in this part of the Central Idaho Recovery Area.

Table W-9. Acres of MPCs Representing Areas Without Roads by Alternative

MPC	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1.1	985,400	985,400	985,400	985,400	985,400	985,400	985,400
1.2	660,900	661,300	661,600	2,537,500	0	661,600	661,600
2.2	25,600	25,600	25,600	25,500	25,600	25,600	25,600
4.1a	800	3,900	21,600	65,500	219,800	2,569,600	84,000
Total Acres	1,672,700	1,676,200	1,694,200	3,451,400	1,099,400	4,242,200	1,756,600
Percent of Ecogroup Area	25%	25%	25%	52%	16%	64%	26%

Bald Eagle *(Issue 1)* - Bald eagles rely primarily on fish for food during the spring, summer, and fall. Their nesting, perching, roosting, and wintering sites tend to be near riparian areas near large bodies of water. Riparian area protection would be provided by management direction under all alternatives. This direction would include a general reduction in vegetation-disturbance activities from past levels, along with goals to maintain or restore large trees where possible for other resource needs, such as shade, bank stabilization, and pool habitat recruitment. These large trees would also provide nesting, perching, and roosting habitat for bald eagles over the short and long term, in both existing and potential eagle territories. Improved riparian and aquatic resource management direction under all alternatives should also help maintain or restore fish populations for bald eagles over the short and long term.

(Issue 2) Human presence and activities have occurred and will continue to occur within and adjacent to bald eagle territories on the Forests. As long as humans are present, there may be short-term displacement, which could result in nest failure. However, Forest-wide direction has been developed to protect bald eagle nesting and wintering areas from disturbance on National Forest System lands under all action alternatives. Specifically, Forest-wide direction in each Forest Plan states:

- Maintain or restore forest structural conditions for nesting and roosting areas near water bodies used by bald eagles.

- Seek funding and initiate preparation of a site-specific Bald Eagle Nest Site Management Plan within 5 years after a nesting territory is determined to be occupied.

- Mitigate, through avoidance or minimization, management actions within known nest or denning sites of TEPC species if those actions would disrupt reproductive success during the nesting or denning period. During project planning, determine sites, periods, and appropriate mitigation measures to avoid or minimize effects.

- Mitigate, through avoidance or minimization, management actions within known winter roosting sites of TEPC species if those actions would adversely affect the survival of wintering or roosting populations. During project planning, determine sites, periods, and appropriate mitigation measures to avoid or minimize effects.

This direction would help reduce disturbance to bald eagles during critical periods and therefore have beneficial effects to Bald eagle over the short and long term. Currently eleven nesting territories are present within the Ecogroup area, which reflects a steady increase in nesting territories over the last 15 years. Within the Central Idaho Bald Eagle management zones, eagles are increasing and exceeding the recovery goals numbers and time frames under current conditions. Bald eagle estimates for 2002 are 11 active nesting territories, four higher than the Fish and Wildlife Service recovery plan objectives for this part of the recovery area. Additional nesting habitat is available for new territory establishment. In habitat without territories, management direction would maintain or restore habitat conditions for perching, foraging, and potential nest sites. This management direction will contribute to viability and persistence of this species within the Ecogroup area.

Northern Idaho Ground Squirrel *(Issue 1)* - All alternatives would follow the 1996 Conservation Strategy and Agreement developed to help recover this species. A Recovery Plan is in the process of being developed, but is not approved at this time. All alternatives would provide management direction to protect and restore this species habitat. Therefore, implementation of all alternatives should have beneficial effects on northern Idaho ground squirrel habitat on Forest Service administered lands. The squirrel is Idaho’s only endemic animal, with an estimated 250-500 individuals. The populations are small, disjunct, and isolated, a situation that challenges future management on the two Ranger Districts where they occur.

Because the northern Idaho ground squirrel has such a limited distribution and extremely low population numbers, potential effects to this species are best addressed at a finer scale, as outlined in the Conservation Strategy and Agreement. More specific direction is contained at the Management Area level, in the three Management Areas the species is known to occur in, and in two other Management Areas where they historically occurred. Forest-wide direction states:

- Maintain or restore vegetative conditions that contribute to the recovery of Northern Idaho ground squirrel habitat. See additional management area direction for Northern Idaho ground squirrels in Management Areas 2, 3, and 5 *(on the Payette National Forest)*.

- Maintain or restore vegetative conditions that contribute to the recovery of Northern Idaho ground squirrel habitat *(on the Boise National Forest).*

Much of the squirrel's preferred meadow and natural opening habitat on the Payette National Forest has been managed in the past, but not in a way that has particularly benefited this species. Many areas adjacent to the meadows historically had large, widely spaced ponderosa pine and Douglas-fir that have been replaced by dense stands of younger trees with dense understories, which may inhibit movement of squirrels between colonies. Many of these meadows and opening have been invaded by trees because of past fire exclusion and grazing. MPC 5.2 offers the most options (tools) for habitat management but not necessarily the most compatible objectives for restoring or maintaining habitat. MPCs 5.1 or 3.2 management prescription would emphasize the restoration of large, widely spaced seral species with an open understory, more similar to habitat that occurred historically. Vegetative conditions best suited for ground squirrel dispersal at individual sites needs to determined including: tree density, tree size, species composition and understory conditions. The same type of vegetative information is needed for meadow areas. MPC 4.1 emphasizes semi-primitive recreation, with limited vegetation management, and is expected to allow successional trends to continue in areas where fires continue to be suppressed with resulting undesirable habitat condition. Habitat conditions in meadows and adjacent forests where squirrels currently occur vary from site to site. It is these fine-scale differences that need to be taken into account in project proposals that intend to improve habitat. Any vegetation treatments should be designed to implement the intent of the North Idaho Ground Squirrel Conservation Strategy, until a Recovery Plan is approved. Management direction will contribute to habitat conditions for viability and persistence of this species.

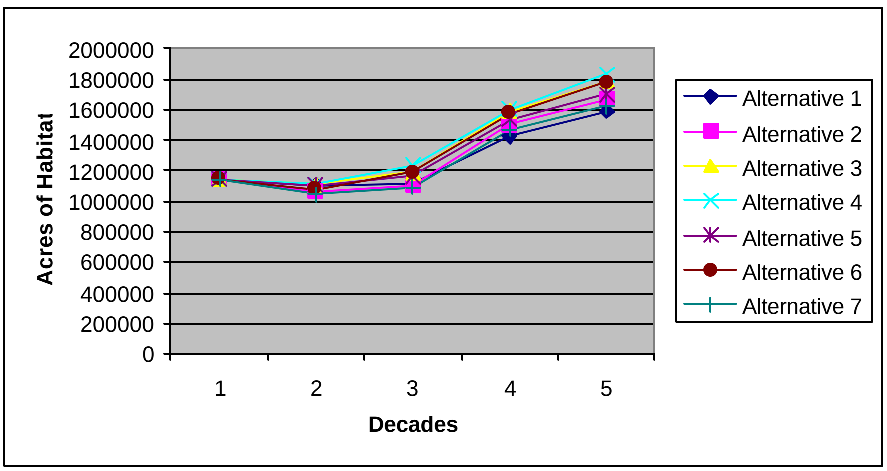
Ground Squirrels have been decreasing in numbers under current conditions (Alternative 1B). All action alternatives have Forest-wide and management area direction to restore ground squirrel habitat over the short and long term. Alternative 1B would require a Forest Plan amendment to incorporate the direction and intent of the conservation strategy or recovery plan. Based on MPC allocations, the alternatives that would have the most effective prescriptions to help restore and maintain ground squirrel habitat are, in descending order, 3, 4, 7, 5, 6, 2, and 1B. The extent and timing of management actions would likely vary somewhat by alternative, but restoration treatments under any alternative would help meet the intent of the North Idaho Ground Squirrel Conservation Strategy.

Canada Lynx *(Issue 1)* - All action alternatives would meet the intent of the standards specified in the 2000 Lynx Conservation Assessment and Strategy (LCAS) developed to help recover this species. Similarly, all action alternatives would provide management direction to protect this species and its habitat, including retention of mature forest conditions and coarse woody debris for denning and rearing habitat. Alternative 1B would require a Forest Plan amendment to incorporate the direction and intent of the LCAS. A reduction in roads under all alternatives would also reduce disturbance and vulnerability to hunting, trapping, and vehicle collisions. Therefore, implementation of all alternatives should have beneficial effects on lynx habitat on Forest Service administered lands. However, the extent and timing of management actions would vary somewhat by alternative.

Much of the estimated lynx's habitat in the Ecogroup area has not been actively managed in the past, other than to suppress wildfires that would have otherwise altered age class, stand structure, and species composition. Most lynx habitat occurs in the higher elevation areas and roadless areas that have had little active management. Thus, many areas that historically had patches of trees in mixed ages, sizes, and species have been replaced by larger stands of even-aged but older trees, in or approaching climax conditions. Long-term fire suppression has generally reduced lynx foraging habitat, but likely benefited denning habitat. Large-scale management activities are not anticipated in lynx habitat; succession and fire will cause most of the vegetation changes long term. Figure W-2 indicates that succession is the major cause for change in lynx habitat, which results in all the alternatives being closely grouped together through time. Although a large amount of lynx habitat has burned within the last 10-15 years, it is estimated that 15-25 years may be needed for succession to advance before some of these recently burned areas turn into lynx foraging habitat. Recently burned areas are not considered suitable lynx habitat until they become re-established with sufficient vegetation to support cover for the lynx and its prey.

As shown in Figure W-2, Alternative 4 would have the best mix of management prescriptions to maintain lynx habitat over the long term, followed in order by Alternatives 6, 3, 7, 2, 5, and 1B.

Figure W-2. Estimated Acres of Lynx Habitat by Alternative



Under 3.2 or 5.1 management prescriptions, stands would be actively managed to move stand age class, density, structure, and species composition toward the HRV for appropriate PVGs. This management would create a better balance of foraging and denning habitat than current conditions in many areas. Foraging and denning habitat would be managed to meet conditions described in the Conservation Assessment and Strategy. Under a 5.2 management prescription, these stands would be regenerated to seral species tree and shrub species over time, which would increase foraging habitat for lynx and its primary winter prey species, snowshoe hare, over current conditions. Retention of patches of large trees for lynx denning would need to be retained in riparian zones and unmanaged areas to meet the area minimum management requirements. Human access and activities would be anticipated to be greatest in this prescription and may adversely affect lynx.

Management prescriptions 4.1, 3.1, 1.2 and 1.1 would passively allow natural processes to influence vegetation structure, composition, and patterns. These prescriptions may or may not achieve more desirable lynx and snowshoe hare habitat conditions over time, depending on variables such as climate, fire ignitions, fire size and intensity, and fire suppression strategies. Although conditions would change over the long term, it is difficult to predict how, where, or when they would change. Conservation Strategy habitat requirements may or may not be met. Human disturbance, however, would be relatively low due to little or no road construction or road use by full-sized vehicles.

Overall, MPCs 3.2 and 5.1 would likely provide the best mix of emphasis and tools for actively restoring or maintaining lynx and snowshoe hare foraging habitat over the short term. Overall, Alternative 3 would provide these MPCs across the largest extent of the Ecogroup area, followed in descending order by Alternatives 2, 7, 5, 4, 1B, and 6.

Within the Ecogroup, 94 Lynx Analysis Units (LAUs) have been identified and mapped based on criteria from the LCAS (USDI FSW 2000): 20 occur on the Boise National Forest, 38 on the Payette National Forest, and 36 on the Sawtooth National Forest. A broad-scale analysis of the each LAU showed that on the Boise National Forest three of the LAUs are out of compliance, with greater than 30 percent of lynx habitat being in a unsuited condition, based on the LCAS programmatic direction. Twenty LAUs on the Payette National Forest and one on the Sawtooth National Forest are also not in compliance. It is believed that the majority of the non-compliance is the result of the recent large fires that have occurred on the Boise and Payette National Forests.

The Ecogroup Forests have the potential for management activities that convert existing lynx habitat and exceed the 30 percent threshold of suitable habitat required by the LCAS. In reality, however, because so few LAUs are close to the threshold, there would not be much potential for habitat conversion from management actions. For one thing, it would likely be beyond the Forests' capacity to implement that much vegetation management during any planning period. For another, management direction under the action alternative would generally not allow this conversion to occur. However, the potential for wildfire in these LAUs is an unknown risk that could cause habitat conversion exceeding the threshold. Management direction will contribute to habitat conditions for viability and persistence of this species.

The LAU is the area in which programmatic management direction is to be evaluated and applied (USDI FWS 2000). A broad-scale analysis, such as the approach used for Forest Plan revision, is not believed to be sensitive to changes at the watershed or project-level scale. Forest-wide direction is in place to implement specific programmatic direction from the LCAS and Amendment. Following the LCAS direction within LAUs should improve conditions for the lynx under all action alternatives.

Candidate Species

Yellow-billed Cuckoo *(Issue 1)* - The key component for yellow-billed cuckoo habitat is extensive riparian cottonwood forest areas. Cottonwood riparian communities are essential for habitat of this species. One of the best examples of this type of habitat is found downstream of

Palisades Reservoir on the South Fork of the Snake River in South Eastern Idaho. There are currently no estimated acres of habitat for this species within the Ecogroup area, but from personal knowledge, habitat is considered limited in extent and isolated.

All action alternatives are anticipated to improve the trend in habitat for this species based on revised Forest-wide direction. Riparian area protection within RCAs/RHCAs would be provided by management direction under all alternatives. This direction would likely result in a general reduction in vegetation-disturbance activities from past levels, and include goals and objectives to maintain or restore cottonwood riparian systems where possible for resource needs, such as shade, bank stabilization, and pool habitat. Management direction will contribute to habitat conditions for viability and persistence of this species. Cuckoos are occasionally observed in southwest Idaho in cottonwood riparian forests; however, information regarding populations within Idaho indicates this species is extremely rare, and the breeding population is likely limited to a few breeding pairs at most. No CDC records are present for this species within the Ecogroup area.

Recently De-listed Species, as of 1999

Peregrine Falcon *(Issues 1 and 2)* - Most potential management activities would do little if anything to affect nesting habitat, which consists typically of cliffs in natural environments. All alternatives could indirectly affect this species as a result of changes in habitat for small birds that peregrines hunt, and these changes would vary somewhat by alternative, depending on how dense forests become over time due to management activities or natural processes. If anything, more open stands created through fire or vegetation management would likely increase foraging areas for peregrines, a positive effect for this species. Management direction is also in place to protect nesting birds from disturbance while nesting and raising their young. Management direction will contribute to habitat conditions for viability and persistence of this species. Alternatives 5, 1B, 2, 7, and 3 would potentially create more openings over the short term than Alternatives 6 and 4. At the present stage of recovery, however, effects on the peregrine from habitat changes for prey species within the Ecogroup area would likely be insignificant. Because this species status is sensitive after de-listing, further habitat analysis would occur for any project proposal that may affect its habitat.

Regional Forester Sensitive Species

Potential effects at the Ecogroup and Forest scales are described below for sensitive species currently listed by the Regional Forester. Assessments estimating habitat acres by alternative were completed for selected forest-dwelling species based on forested PVG and structural stage combinations. This is an approach similar to that used by Wisdom et al. (2000). This type of assessment generally overestimates the amount of habitat because it selects all acres of a particular PVG/structural stage combination that a species was assigned. Some of the combinations are too small in extent to meet species home range requirements. Also, some fine-scale attributes, such as snags and logs, may be lacking, which make the habitat unusable. However, this coarse-scale analysis is still useful because it displays relative differences between alternatives and trends in habitat amount through time for macro-habitat elements. It also identifies species where factors other than habitat may be keeping populations lower than a habitat assessment would suggest. For example, direct mortality may be limiting a population, but not the amount of habitat.

This type of approach also has the advantage of tracking coarse-filter habitat components (such as large trees) for all species that use an area, rather than for individual species, as in the species-by-species approach that has been done in the past. Based on MPC assignments, some of the alternatives would increase the extent of habitat components (PVGs/structural stages) at different rates and amounts, and this would affect different species habitat in somewhat different ways. These differences are described for each species if known.

Forest-wide direction is present for all sensitive species for the action alternatives. Species may come and go off the sensitive list, but the general direction will apply (see revised Forest Plans, Chapter III, Wildlife Resources section, Sensitive Species). The original Forest plans have little or no management direction dealing with Regional Forest Sensitive species. The Regional Forester's sensitive species "list" was first developed in the early 1990s and some base level direction was developed in the Forest Service Manual 2670 and Handbooks 2609. This direction as amended gives individual Forests basic direction for the management of Regional Foresters Sensitive Species. Manual and Handbook direction applies to all Forest Plans, and any projects implemented are obligated to follow the direction as amended, including Alterative 1B. For the effects analysis, Alterative 1B represented the current plans with direction in the Manual and Handbooks. The action alternatives follow the Manual and Handbook direction, plus additional direction for species and their habitat where specific issues have been identified.

Wolverine *(Issue 2)* **-** Wolverines are considered habitat generalists, and their home ranges are so large that they are usually measured in hundreds of square miles rather than thousands of acres. Thus, specific habitat needs are not as important as reducing human disturbance, particularly in natal den sites (subalpine talus cirques) during the denning period.

Because this species prefers high-elevation, remote areas in which to den and forage, wolverine habitat is found mostly on Forest Service lands and has generally been little affected by past management activities in terms of road construction, timber harvest, and altered fire regimes. It has been suggested that large unroaded areas are needed to maintain or improve conditions for wolverine in order to minimize disturbance and vulnerability from trappers, hunters, predators, and collision with vehicles. Direction proposed under all action alternatives would mitigate management actions within known denning sites of sensitive species if those actions would disrupt the reproductive success of those sites during the nesting or denning period. Management direction will contribute to habitat conditions for viability and persistence of this species. This direction would need to be added to the Forest Plans under the No Action Alternative for 1B to provide the same level of protection.

As seen in the analysis for gray wolf above, Table W-9 indicates that Alternative 6 would have the most areas without roads, followed in order by Alternatives 4, 7, 1B, 2, 3, and 5. For all alternatives, areas without roads would represent a substantial percentage of the overall Ecogroup area; however, Alternative 6 would have four times as much area in a roadless condition as Alternative 5. As this species is sensitive, further analysis would occur for any project proposal that may affect its habitat.

Forest Tree-Adapted Species - The next seven sensitive species are dependent on forest vegetation. Their habitats were evaluated with the aid of the vegetation SPECTRUM quantitative model outputs (see Appendix B for more information on this model). These species were selected because it is believed that their habitats have decreased or changed greatly from historic conditions, with possible implications for viability concerns (Raphael et al. 2000, Wisdom et al. 2000). These species were assigned PVG/structural stage combinations that they use as habitat. Habitat acres were generated by PVG/structural stage combinations from the SPECTRUM model outputs and then used to estimate habitat change for forest vegetation for each alternative (Vegetation Diversity Chapter 3, Wildlife Technical Report 2003). Changes in habitat acres were also tracked through five decades to show trends in habitat through time. The habitat acres displayed are not absolute, but should be regarded as only depicting relative trends over time from the different alternatives. In addition, the acreage predictions are a coarse-scale estimate and usually an over-estimation. Other finer-scale habitat attributes are assumed to be present to meet a particular species needs; for instance, snags in the case of woodpeckers. Snags and understory vegetation cannot be accurately modeled at the Ecogroup-wide scale and have to be evaluated at the project level. For this coarse-scale analysis the trend lines are more important then the acreage amounts. The trends displayed in the figures below for the different alternatives are the result of model outputs based on desired vegetation conditions, which vary by alternative. Management direction has been added that should further complement and improve the habitat trends and help resolve other issues not covered by modeled habitat estimations for these species.

Historical acreage estimates (Wisdom et al. 2000) were developed using a different model, and the vegetation was classified differently than in the SPECTRUM model (Morgan and Parsons 2001). Thus, a direct comparison between historic habitat acreage and predicted habitat acreage by alternative should not be made, although trends are important. Also, historic conditions were variable within a Historic Range of Variability (HRV) rather than a set point. The acre changes over time are meaningful only for a comparison of trends in habitat for different alternatives.

The forested vegetation structure outcomes from the SPECTRUM model were used in the wildlife habitat modeling process. A fundamental assumption of the analysis is that if the alternative depicts an increase in macro-habitat features from current conditions, the viability of the species is improving due to anticipated management actions, allowing for species persistence. It is also assumed that if the alternatives desired conditions are approaching or fall within the HRV for vegetation and habitat conditions, the viability for wildlife species will be improving and/or maintained. However, this does not mean our forests must return completely to the range of historical conditions to sustain biological diversity (Morgan and Parsons 2001). Historically, environmental conditions were variable, and changing conditions modified habitats over both the short and long term.

Often there appears to be a dip in large tree structure in the first or second decade as part of the outcomes from the modeling effort. This is likely occurring as an artifact of how the growth matrix was input into the model. Each growth stage has an inherent age range (such as 100 to 140 for medium tree high density) that may differ by PVG. The model uses the mid-point of the range (120) as the starting point for moving the vegetation through the modeling process.

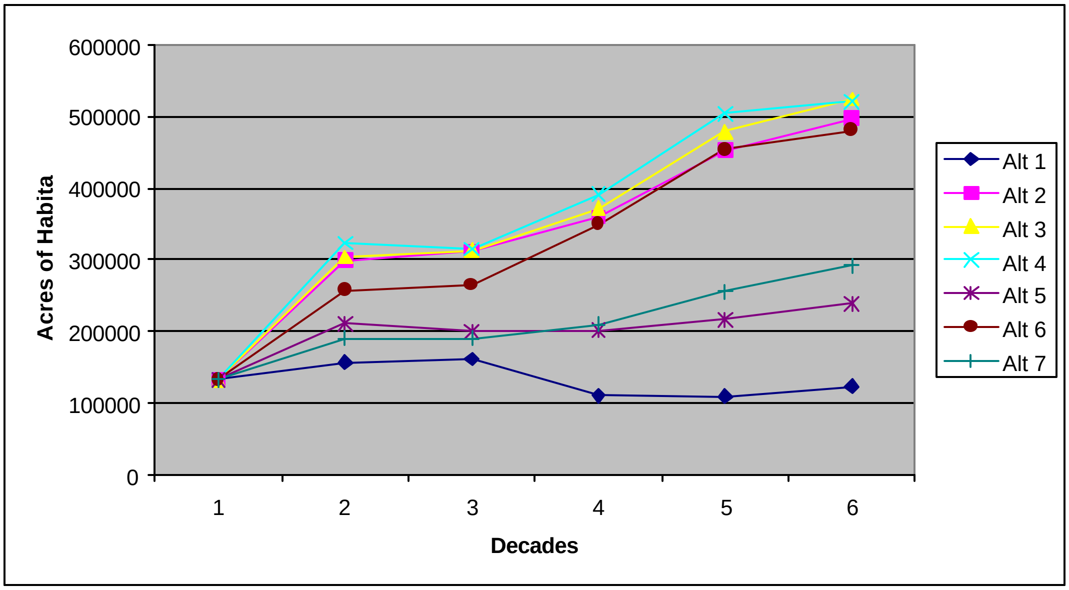
Therefore, in the model it may take two decades before medium trees move into the large tree structure, while management actions or background fire are taking large tree structure to grass/forbs/shrub/seedling structure. Thus, a reduction in large trees is being reflected in the model that may not actually be occurring on the landscape.

For several species, the patterns and trends of habitat are similar. One reason for this is that only a minor percentage of vegetation within any PVG would be treated by any alternative during a given decade. Another reason is the large tree minimum management requirement built into the model and management direction. For all action alternatives, the model is trying to increase the amount of large trees present on the landscape, thus benefiting the species adapted to them, except in Alternative 1B where a different large tree management requirement is used based on current plan direction. The majority of the vegetation in all PVGs continues along the successional pathway toward larger tree sizes, upon which these species depend. This pathway is occasionally interrupted by natural disturbance such as fire, but again, the majority of the vegetation in all PVGs continues to grow toward the larger tree classes. This pattern is not always repeated in nature, where large stochastic disturbance events can change vegetation components over large landscapes in a short period of time; however, these large events are unpredictable and difficult to model.

White-headed Woodpecker *(Issue 1)* - White-headed woodpeckers occur in forest types (PVGs 1, 2, 3, and 5) with a high proportion of large ponderosa pine at low tree densities. There are currently an estimated 130,000 acres of habitat for this species within the Ecogroup area. It is estimated that historically there was a much greater amount. Many unmanaged areas do not presently benefit the white-headed woodpecker because they have higher tree densities due to fire exclusion and little or no improvement treatments. Conversely, many areas of historical habitat have been converted by the removal of large trees, primarily through timber harvest.

All action alternatives show an increasing trend in the amount of white-headed woodpecker habitat through time compared to the current condition. This increasing habitat trend should increase the likelihood of continued persistence and improve viability for this species. However, 1B, the No Action Alternative, results in a continued decrease in habitat for the first five decades (Figure W-3).

Figure W-3. Estimated Acres of White-Headed Woodpecker Habitat by Alternative Over Five Decades

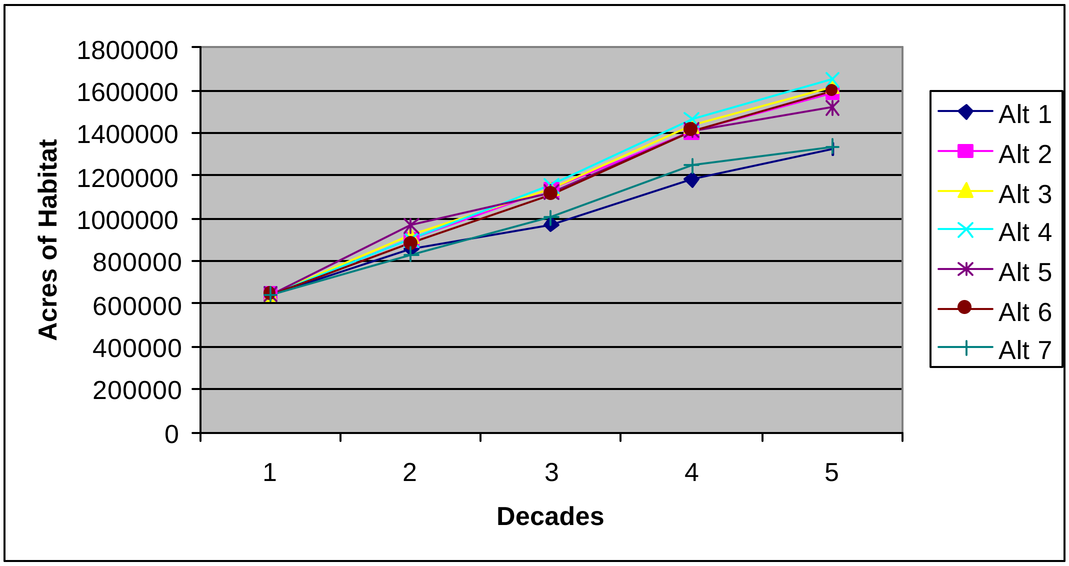


Over the next five decades, the most white-headed woodpecker habitat would occur under Alternative 3, followed in descending order by Alternatives 4, 2, 6, 7, 5, and 1B. This species habitat will benefit from increasing the extent of large ponderosa pine and reducing tree densities. Alternatives that have a restoration and fire use emphasis, such as Alternative 3, benefit this species, because non-lethal fire use reduces tree densities. Direction for the recruitment and retention of snags would also benefit this species. Management direction for the appropriate numbers and sizes of snag and down log incorporated the needs of species dependent on these habitat attributes. Road decommissioning would also benefit this species by increasing snag retention through restricted access. Because this species is sensitive and proposed as an MIS, all alternatives would have to maintain or improve its habitat conditions. Alternative 1B has a lower management requirement for the extent of desired large tree structure than the other alternatives and better access for snag removal, which would likely result in less desirable outcomes for this species' habitat and a continued viability concern.

Fisher *(Issue 1)* - Key components for fisher habitat are forested riparian areas, mature to old forests (PVGs 3, 4, 6, 7, 8, 9, 10, and 11) with moderate moisture conditions, and snags and coarse woody debris. Riparian forest communities are very important habitat for this species, and they are used disproportionately where available. There are currently an estimated 610,000 acres of habitat for this species within the Ecogroup area.

All alternatives show an improving trend in habitat for this species. Over the next five decades, the most fisher habitat would occur under Alternative 4, followed in descending order by Alternatives 6 and 3, 2, 5, 7, and 1B (Figure W-4).

Figure W-4. Estimated Acres of Fisher Habitat by Alternative Over Five Decades



This species habitat will benefit from the increase in the extent of large trees on the landscape. This is occurring because much of the habitat (PVGs) where this species occurs has limited amounts of mechanical management activities, and succession is producing additional mult-storied stands with large trees. This increasing habitat trend should increase the likelihood of continued persistence and improve viability for this species. Alternative 1B has a lower management requirement for the extent of large tree structure desired then the other alternatives, thus this alternative produces the least amount of habitat. Direction for the management of snags will also benefit this species, which uses snags and down logs for denning and hunting prey. Management direction for the appropriate numbers and sizes of snag and down log incorporated the needs of species dependent on these habitat attributes for denning and prey habitat. Road decommissioning will also benefit this species by increasing snag retention through restricted access.

In addition, riparian area protection within RCAs/RHCAs would be provided by management direction under all alternatives. This direction would likely result in a general reduction in vegetation-disturbance activities from past levels, and include goals to maintain or restore large trees where possible for other resource needs, such as shade, bank stabilization, and pool habitat recruitment. These trees would also provide foraging habitat and movement corridors for fisher over the short and long term, in both existing and potential habitat. However, information regarding populations within Idaho indicates that species viability is a concern because of population isolation, small size, and direct mortality in spite of improving trends in habitat. As this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

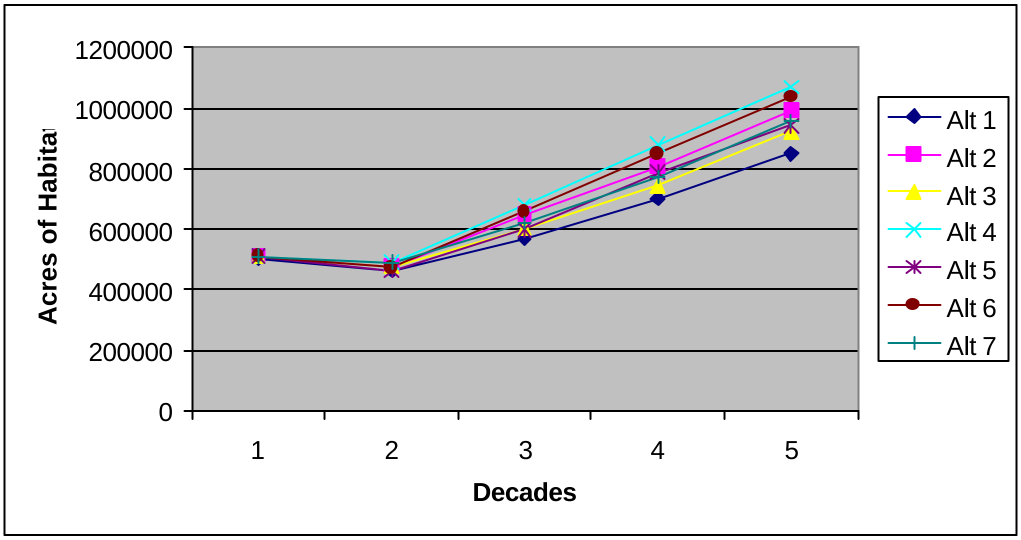
Boreal Owl *(Issue 1)* - Boreal owls inhabit mid- to higher-elevation forests that are capable of growing large-diameter trees. Snags and down logs are also necessary habitat attributes. It is estimated there are currently 500,000 acres of habitat for this species within the Ecogroup.

All alternatives show an improving trend in habitat for this species after the first decade (Figure W-5). Over the next five decades, the most boreal owl habitat would occur under Alternative 4, followed in descending order by Alternatives 6, 2, 7, 5, 3 and 1B.

The minor reduction in habitat for the first decade is likely the result of a modeling constraint (see discussion under Tree Dependent Species, above, and Appendix B). Large-scale management activities are not anticipated in extensive areas of boreal owl habitat, so succession and fire will cause most of the vegetation changes.

This species habitat will benefit from the increase in the extent of large trees on the landscape. This increase is occurring because much of the habitat (PVGs) where this species occurs at higher elevations, which would have limited amounts of management activities, and succession is producing additional multi-storied stands with large trees. Direction for the management of snags will also benefit this species. Management direction for the appropriate numbers and sizes of snag and down log incorporated the needs of species dependent on these habitat attributes. The results for all the alternatives are similar. This increasing habitat trend should increase the likelihood of continued persistence and improve viability for this species. Alternative 1B has a lower management requirement for the extent of desired large tree structure than the other alternatives; thus this alternative produces the least amount of habitat, but still shows an improving trend, likely because of advancing succession in high-elevation forest. As this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Figure W-5. Estimated Acres of Boreal Owl Habitat by Alternative Over Five Decades

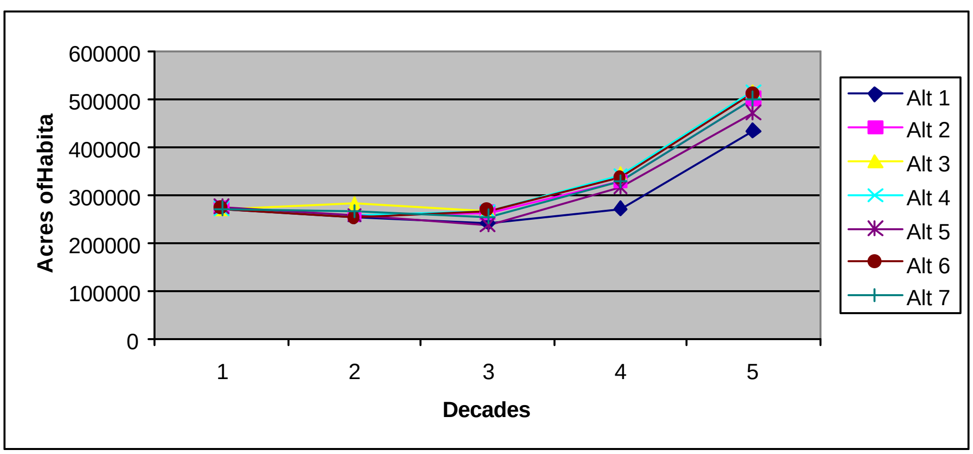


Great Gray Owl *(Issue 1)* - The habitat components considered most important for this species are: a) mature or older open forest habitat to provide suitable nesting sites; and b) suitable foraging habitat that includes non-stocked and seedling forests, meadows, and open riparian habitats adjacent to forested vegetation in PVGs 9, 10, and 11. This owl appears not to use steep slopes and is usually found in gentle rolling terrain, with open areas to hunt for prey. An estimated 280,000 acres of habitat for this species occur within the Ecogroup area. The analysis is believed to over-estimate the extent of this owl's habitat, because the model cannot restrict its coverage to the PVGs that are just adjacent to meadows and riparian areas. The great gray owl is not a species of concern within the Columbia River Basin (Wisdom et al. 2000).

All alternatives show an improving trend in habitat for this species after the first decade (Figure W-6). Over the next five decades, the most great gray owl habitat would occur under Alternative 4, followed in descending order by Alternatives 6, 7, 2, 3, 5, and 1B.

The minor reduction in habitat for the first decade is likely the result of a modeling constraint (see discussion under Tree Dependent Species, above, and Appendix B). Much of the estimated Great Gray owl habitat on the Ecogroup has not been actively managed in the past, other than to suppress wildfires that would have otherwise altered age class, structural, and species composition. Large-scale management activities are not anticipated in this habitat, so succession and fire use will cause most of the vegetation changes. All the alternatives have similar outcomes (improving trends), and there is little difference between alternatives. The trends are occurring because much of the habitat (PVGs) where this species occurs at higher elevations, which would have limited amounts of management activities; thus succession is producing additional multi-storied stands with large trees.

Figure W-6. Estimated Acres of Great Gray Owl Habitat by Alternative Over Five Decades



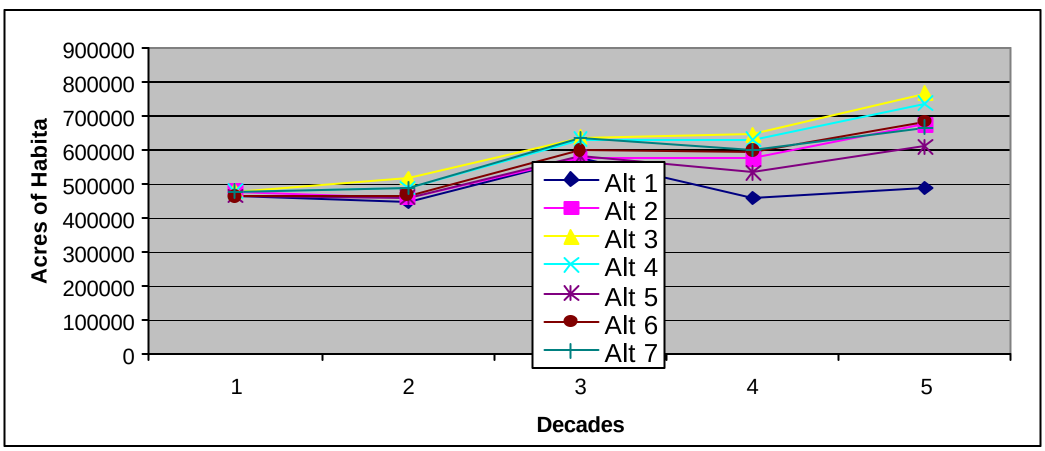
Management direction for the appropriate numbers and sizes of snag and down log incorporated the needs of species dependent on these habitat attributes. This increasing habitat trend should decrease the risk of continued persistence and improve viability for this species. Alternative 1B has a lower management requirement for the extent of desired large tree structure than the other alternatives, thus this alternative produces the least amount of habitat, but still shows an improving trend. Because this species is sensitive, further habitat analysis would occur for any project proposal that may affect its habitat.

Flammulated Owl *(Issue 1)* - Flammulated owls use lower-elevation forested areas that contain large ponderosa pine, Douglas-fir, and aspen trees of moderate densities, along with large snags for nesting. An estimated 480,000 acres of habitat currently exist for this species within the Ecogroup area.

All alternatives show a decrease in the first decade, followed by an increase until the fourth decade (Figure W-7). The reduction in habitat for the first decade is, at least in part, a result of a vegetation modeling constraint (see discussion under Tree Dependent Species, above, and Appendix B). The decrease after the fourth decade could be a concern for this species for some of the alternatives in the long term if it continues. Over the next five decades, the most flammulated owl habitat would occur under Alternative 3, and Alternatives 2, 4, 6, and 7 would have similar but somewhat lesser amounts than 3. Alternatives 1B and 5 display the slowest rate of improvement, with 1B showing a decrease in habitat after the third decade.

This species habitat will benefit from increasing the extent of large ponderosa pine, Douglas fir, and aspen and reducing tree densities. Alternatives that have a restoration and fire use emphasis, such as Alternative 3, benefit this species, because thinning and non-lethal fire use will reduce tree densities. Direction for the management of snags will also benefit this species. Management direction for the appropriate numbers and sizes of snag incorporated the needs of species dependent on these habitat attributes. Road decommissioning will also benefit this species by increasing snag retention through restricted access. This increasing habitat trend should increase the likelihood of continued persistence and improve viability for this species.

Figure W-7. Estimated Acres of Flammulated Owl Habitat by Alternative Over Five Decades



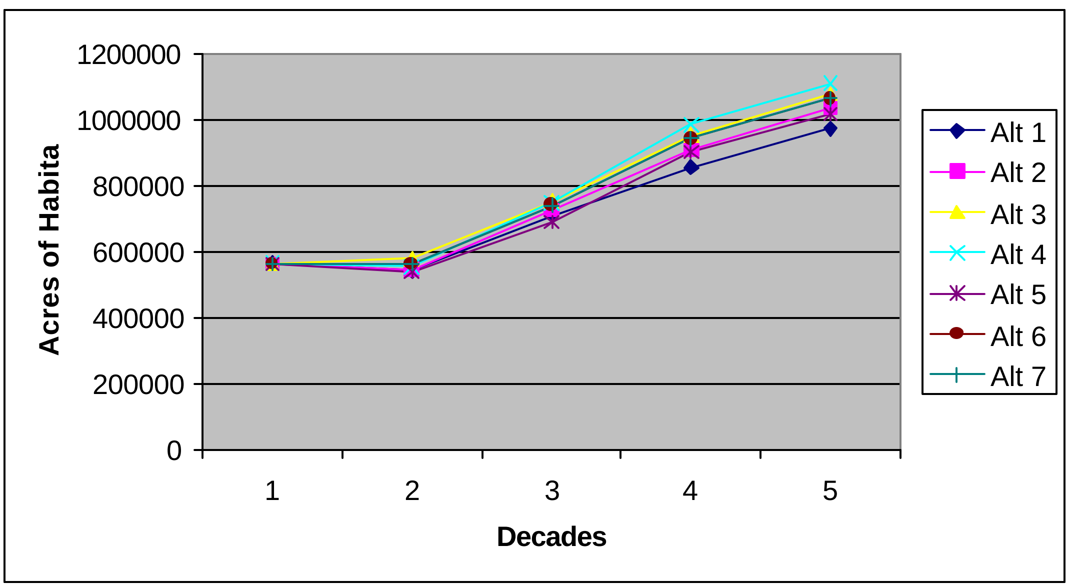
Alternative 1B has a lower management requirement for the extent of desired large tree structure than the other alternatives and the most road access, thus this alternative produces the least amount of habitat, thus a concern for the continued persistence of this species. As this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Northern Three-toed Woodpecker *(Issue 1)* - These woodpeckers take advantage of areas with extensive tree mortality and can be thought of as opportunists when these conditions occur. They reside in most of the higher-elevation forests within PVGs 7, 8, 9, 10, and 11. They have evolved with forest systems where insects, disease, and fire create conditions that produce abundant snags insects and insects for nesting and feeding. This species cycles in response to these disturbances and should have benefited greatly from the hundreds of thousands of acres that burned during the last ten years. Recent increasing insect activity in many of the lodgepole pine communities should also benefit this species in the near future. An estimated 580,000 acres of habitat for this species occurs within the Ecogroup area. This large amount is likely a result of long-term fire exclusion, which has resulted in increasing insect, disease, and wildfire mortality.

All alternatives show an improving trend in habitat for this species after the first decade (Figure W-8). Over the next five decades, the most northern three-toed woodpecker habitat would occur under Alternative 4, followed in descending order by Alternatives 6 and 3, 7, 2, and 5 and 1B.

Habitat increases are likely a result of the anticipated increase in tree mortality under all alternatives at higher elevations as these forests become older and more susceptible to insect, disease, and fire events. Management direction for the appropriate numbers and sizes of snag and down log incorporated the needs of species dependent on these habitat attributes. The minor reduction in habitat for the first decade is likely the result of a modeling constraint (see discussion under Tree Dependent Species, above, and Appendix B). The overall increasing habitat trend should increase the likelihood of continued persistence and improve viability for this species.

Figure W-8. Estimated Acres of Northern Three-toed Woodpecker Habitat by Alternative Over Five Decades



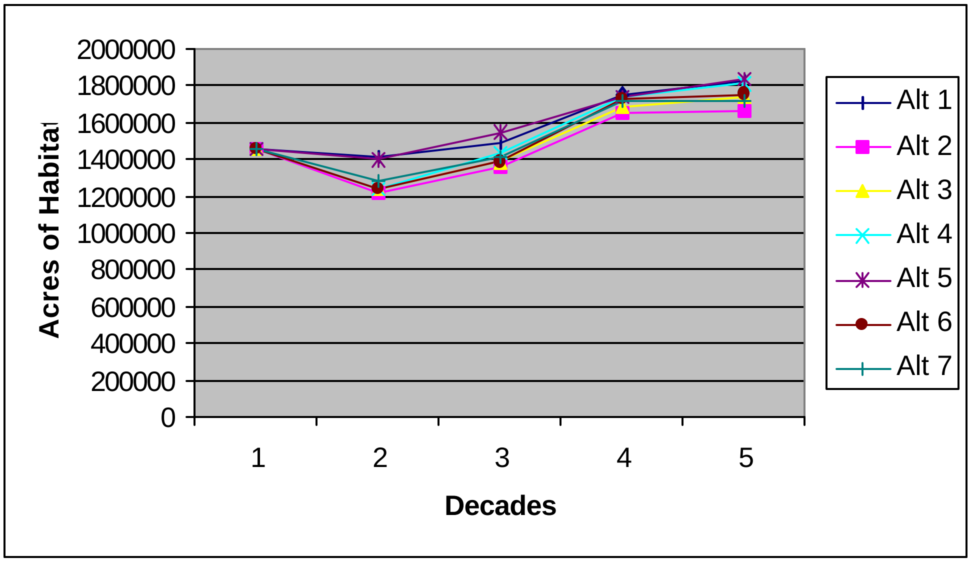
Alternative 1B has a lower management requirement for the extent of desired large tree structure than the other alternatives; thus this alternative produces the least amount of habitat, but still shows an improving trend. Because few mechanical treatments will occur in this specie's habitat, succession is the major controller of vegetation (habitat), which results in all the alternatives having similar outcomes. As this species is sensitive, further habitat analysis will occur any project proposal that may affect its habitat.

Northern Goshawk *(Issues 1 and 2)* - Goshawks use all forest types within the Ecogroup area, and they select nesting sites that usually have larger trees available compared to surrounding areas, and an abundant prey base. An estimated 1,410,000 acres of habitat for this species currently occurs within the Ecogroup area.

All alternatives show an improving long-term trend in habitat for this species as a result of increasing the amount of large tree structure on the landscape (Figure W-9).

All alternatives are producing a larger extent of area with large trees. This is occurring in areas with planned management activities that will actively increase the extent of large trees. This is also occurring in areas with little or no planed management because of plant succession. Direction for the management for the appropriate numbers and sizes snags will also benefit this species because many of its prey use snags as habitat. The minor reduction in habitat for the first decade is likely the result of a modeling constraint (see discussion under Tree Dependent Species, above, and Appendix B). Differences in the amounts of habitat over the next five decades for all alternatives are very minor, with a slowly improving trend. This increasing habitat trend should decrease the risk of continued persistence and improve viability for this species.

Figure W-9. Estimated Acres of Northern Goshawk Habitat by Alternative Over Fire Decades



Management direction proposed under all alternatives would mitigate activities within nesting stands and fledging areas that may disrupt nesting and fledging. Because this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Other Sensitive Species

Columbian Sharp-tailed Grouse *(Issue 1)* - In the past some mountain shrub communities were converted and seeded to non-native grasses to increase forage for livestock. Due to the importance of these habitats to sharp-tailed grouse and other species, these types of actions would no longer occur under the action alternatives. The continued emphasis in the No Action Alternative (1B) on production of livestock forage could result in additional areas being converted to non-native grasses, and the maintenance of non-native seedings in areas already converted. Another concern has been the recent extensive modification of some of these communities due to wildfire in the five Management Areas where sharp-tailed grouse are known to occur. It is believed that wildfire historically was the disturbance that played the largest role in modification of these communities. Once these areas have burned, it will take an estimated 20-30 years before sharp-tailed grouse can use them as wintering habitat. Fire is not undesirable in these communities, but the extent and timing can be a concern in localized areas and some management areas. As this species is sensitive, further habitat analysis will occur any project proposal that may affect its habitat.

Mountain Quail *(Issue 1)* - These birds are known to occur on the Boise and Payette National Forests, but not the Sawtooth. They use low-elevation dense shrub areas of coniferous forest and shrubby riparian area at the forest/non-forest interface. These types of habitats are not depicted by the 30-meter LANDSAT imagery used to map Ecogroup vegetation. Wisdom et al. (2000) estimate a reduction of 12 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU. No estimate of the amount of their habitat is available within the Ecogroup area. Population numbers can be reduced by habitat degradation caused by human activities such as urbanization and livestock overgrazing. It is estimated that very little if any development or proposed management activities would occur in mountain quail habitat under any alternative. Riparian areas would be protected from overgrazing and other management-related disturbances under all alternatives through Forest Plan RCA/RHCA direction. Therefore, all alternatives would have little or no adverse impacts on mountain quail habitat, and would likely improve habitat conditions over the short and long term. As this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Harlequin Duck *(Issue 1)* - Harlequin ducks nest along high-gradient mountain streams in north central Idaho. No nesting has been documented during surveys for this species in the Ecogroup area. The birds that have been observed are believed to be passing through to nesting areas outside the area. No alternative would influence the birds' ability to pass through the area to their nesting territories elsewhere. The locations where these birds have been observed are within forested riparian areas. Riparian area protection for RCAs/RHCAs provided by Forest Plan direction would maintain or restore riparian habitat conditions under all alternatives.

Direction for habitat protection should increase the likelihood of continued persistence and improve viability for this species. Therefore, all alternatives would have a beneficial effect on this species, and provide for continued migration to and from nesting areas. Because this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Spotted Bat *(Issues 1 and 2)* - Spotted bats roost in crevices of high cliffs and forage in sagebrush shrub and low-elevation forest. This species is very sensitive to human disturbance during roosting, but has not been detected within the Ecogroup area in limited surveys that have been completed. No management actions are proposed that would modify high cliff roosting areas for this species. Forest-wide standards and guidelines have been added for surveying and protecting bat hibernacula under all action alternatives. If bats were detected, actions would be taken to protect these sites from disturbance. No actions are proposed to eliminate or convert native shrublands to non-native species. The No Action Alternative (1B) would likely continue to degrade spotted bat foraging habitat by removing shrub/brush vegetation to increase grass composition to maintain or increase livestock forage. However, all alternatives should have no significant effects on roosting habitat for this species, as there are no management activities proposed that would modify or destroy crevices of cliffs. Direction for habitat protection should increase the likelihood of continued persistence and improve viability for this species. Because this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Townsend's Big-eared Bat *(Issues 1 and 2)* - The Townsend's big-eared bat is known to occur in several locations within the Ecogroup area. Forest-wide standards and guidelines for surveying and protecting bat hibernacula have been added and would apply under all action alternatives. Management direction has also been developed to protect roosting sites and hibernacula from disturbance, when bats are detected. Management direction for the appropriate numbers and sizes of snag and incorporated the needs of species dependent on these habitat attributes for night roosting. Direction for habitat protection should increase the likelihood of continued persistence and improve viability for this species. The No Action Alternative (1B) does not address identification or protection of bat hibernacula and therefore could pose a greater risk to Townsend's big-eared and spotted bats. Because this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Spotted Frog *(Issue 1)* - All alternatives are expected to maintain the current distribution of spotted frogs within the Ecogroup area. Habitat conditions are expected to improve under all alternatives. The Forest Service will follow legal direction (Executive Order 11990) that mandates that wetlands will not be destroyed or negatively affected. RCA/RHCA management direction would provide additional protection to habitat for this species under all alternatives. In addition, the action alternatives provide management direction to reduce the impacts of fish stocking on native species, which should help maintain the spotted frog. The spotted frog has been eliminated in some high-elevation lakes because of past fish stocking. Direction for habitat protection should increase the likelihood of continued persistence and improve viability for this species. Similar direction would need to be added to the No Action Alternative to address these concerns. Because this species is sensitive, further habitat analysis will occur for any proposal that may affect its habitat.

Common Loon *(Issues 1 and 2)* - Loons are known to nest in extreme eastern Idaho in natural lakes. No nesting has been documented for this species within the Ecogroup area. The birds that have been observed on some of the natural and man-made lakes are believed to be passing through to nesting areas outside the area. This species has also been observed in the general area on major rivers and reservoirs during their spring and fall migration. Wintering birds are mostly found on bays and coves along the coast of the Pacific Ocean. Loons are solitary nesters. Loons and humans (at moderate densities) can co-exist on lakes that provide some undisturbed suitable shoreline or islands for nesting. Islands are preferred sites. If nesting is documented in the Ecogroup area, appropriate direction is in place for sensitive species nesting habitat protection under the action alternatives. No alternative would influence the birds ability to pass through the area to their nesting and wintering areas elsewhere. Riparian area protection provided by Forest-wide direction would maintain or restore riparian habitat conditions under all alternatives. Therefore, all alternatives would have a beneficial effect on this species, and provide for continued migration opportunities. Direction for habitat protection should increase the likelihood of continued persistence and improve viability for this species. Because this species is sensitive, further habitat analysis will occur for any project proposal that may affect its habitat.

Species of Special Interest

Rocky Mountain Elk *(Issue 2)* - Access management in selected locations to restrict motorized travel during the hunting season is occurring on all three Forests to help meet state elk objectives. Access management is currently conducted through agreements with state agencies. These agreements are expected to continue, and Forest Plan direction encourages the coordination of access management with the appropriate state and federal agencies, and tribes. Because access restrictions can change seasonally and annually, mapping of these areas for revision analysis was not completed at the Ecogroup scale.

Elk populations within the majority of the Ecogroup are currently at record high levels. It is assumed that alternatives with the least road development or that maintain the current situation with regard to access would provide the security to allow elk to stay at current population levels within the game management units. As seen in Table W-8, all alternatives show an overall reduction in road miles over the short term. Based on proposed vegetation management opportunities, Alternative 3 would reduce roads the most, followed in order by Alternatives 2, 7, 4, 5, 1B, and 6. Table W-9 indicates that Alternative 6 would have the most areas without roads, followed in order by Alternatives 4, 7, 1B, 2, 3, and 5. Roadless areas would provide large security areas for elk, and make hunting elk in those areas more challenging. Also, as existing road numbers are reduced, additional security areas may be created.

In areas that are managed to reduce stand density to improve habitat for other species of concern, such as white-headed woodpecker, elk security would likely decrease because of the open stand conditions created. The anticipated increased use of non-lethal fire will likely also reduce the extent of areas that are used for security. If the same level of elk security were desired in these areas, additional access management restrictions would likely be needed to mitigate the change in vegetation conditions.

Bighorn Sheep *(Issue 2)* - Alternatives that reduce suitability for domestic sheep grazing in the disease risk areas would be most beneficial to bighorn sheep. Alternatives 3, 4, 6, and 7 reduce domestic sheep suitability in one area (see *Rangeland Resources* section, Acres Deducted Due to Bighorn Sheep Habitat). Implementation of all alternatives would result in bighorn sheep populations still being small and isolated in the southern portion of the Sawtooth National Forest. The Hells Canyon area has the greatest chance of an expanded population that could interact with other populations because of the large amount of bighorn sheep habitat present. Currently there is a multi-state agency agreement for the Hells Canyon area for dealing with disease risk between domestic sheep and bighorn sheep that cross the Snake River into Oregon from Idaho.

Snowshoe Hare *(Issue 1)* - Snowshoe hares inhabit boreal forest (high elevation) and dense riparian willow areas, and are important to management because they are the primary winter prey for Canada lynx. Within these types of vegetation, hares select for areas of small-diameter, dense young trees, and forest with dense shrub understories for both food and cover. These types of habitats are not captured by the 30-meter LANDSAT imagery used to map Ecogroup forest vegetation; therefore no estimate of the amount of habitat is available within the Ecogroup area. To be usable by hares, this type of habitat must be exposed above deep snow during the winter. This species cycles in response to these disturbances such as stand-replacing fire and should benefit greatly from the hundreds of thousands of acres that burned during the last ten years within the Ecogroup area. Areas recently burned should develop into quality hare habitat in 15 to 25 years after burning. Recent increasing insect activity in many of the lodgepole pine communities should also benefit this species in the near future, as these stands die, become more fire prone, and become re-established. Most of the habitat where snowshoe hares occur is not proposed for extensive vegetation management activities other than fire use. Succession and fire will play the major role in modifying habitat. Effects of all alternatives are assumed to be similar based on the role of succession, as well as direction for management activities in the LCAS.

Management Indicator Species

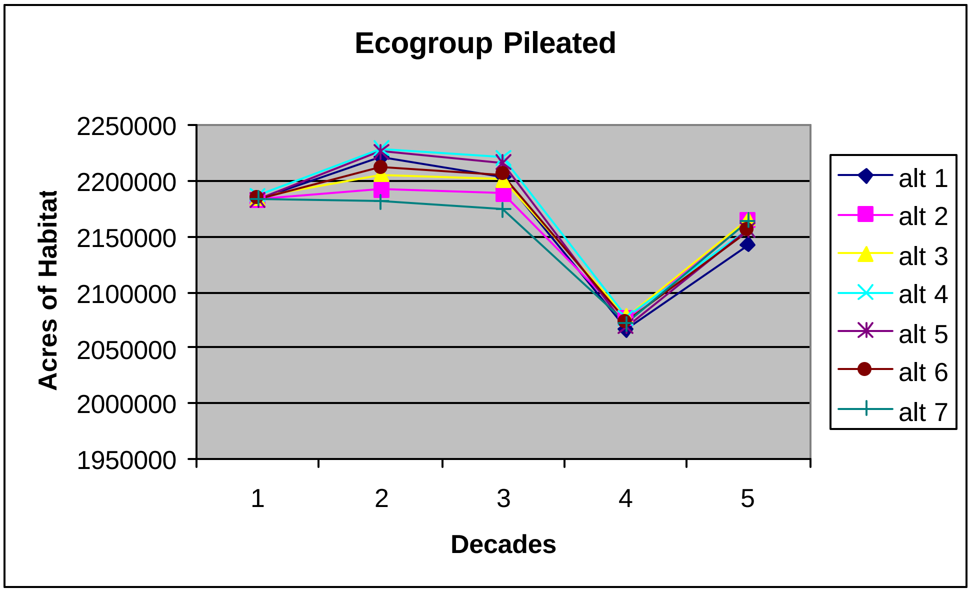
Sage Grouse *(Issue 1)* - None of the alternatives would change the extent of sagebrush communities within National Forest System lands. However, alternatives may change the structural stages of sagebrush to different degrees through the use of fire and other management activities. In the past, some of these communities were converted to seeded non-native grasses to increase forage for livestock. The primary concern has been the recent extensive modification of some sagebrush communities due to wildfire in the management areas where grouse are known to occur. Once these areas have burned it will take an estimated 10-20 years before grouse will use them. Due to the concern over the depressed population status of sage grouse, proposed projects will need to be carefully evaluated with local information in order to maintain or improve conditions for them. The desired conditions for sagebrush provided in the revised Forest Plans for the action alternatives should contribute to habitat maintenance or improvement. The revised plans also provide Management Area direction to address situations where wildfire has created a concern for this species. Because of the emphasis on livestock forage production, sagebrush communities may continue to decline under the No Action Alternative (1B). As this species is proposed as an MIS, potential effects will have to be evaluated during any project proposed within sage grouse habitat.

Pileated Woodpecker *(Issue 1)* - This species is native to North America, and they are known to occur across southern Canada. In the western U.S. they occur in Washington, Oregon, California, Nevada, Idaho and Montana in forest types that can grow large diameter trees. They are also found in the forested portions of all the eastern states with both pine and hardwood forests. This species uses mature forests with moderate to high tree densities and canopy closures, and well-developed understories with snags and down wood for nesting and feeding sites. These characteristics were provided by PVGs 3, 4, 6, 7, and 8. Stand characteristics are described as having moderate to high tree densities and large live trees and large snags and down material. The Wisdom et al. (2000) analysis estimated that pileated woodpecker source habitat has increased of 21 percent within ERU 13. This increase is due to fire suppression that has allowed for an increase in multi-storied stands and shade-tolerant trees. These conclusions are further supported by Breeding Bird Surveys in Idaho, which show a increasing presence of this species from the recent past in areas survey. However, past management within localized areas has resulted in a loss of pileated woodpecker habitat in some areas. Past logging and large wildfires have reduced the quality and quantity of habitat within portions of the Ecogroup area and possibly affected the distribution of territories, but not viability of the species. In addition, emphasis on retention and recruitment of large snags and down logs is an important management consideration for this species habitat.

Figure W-10 shows habitat trends for this species over the next five decades by alternative. After the third decade, habitat extent decreases with all alternatives, then increases after the fourth decade. Alternative 1B has a lower management requirement for the extent of desired large tree structure than the other alternatives; thus this alternative produces the least amount of habitat.

The reduction in habitat for the third decade is likely a result of the conversion of multi-storied stands to single-storied stands. Further reductions are anticipated over what is represented in Figure W-9 because of increased use of fire. Non-lethal management-ignited fire will reduce the amount of snags and logs in the drier PVGs used currently as foraging sites by the pileated for carpenter ants. Management direction for the appropriate numbers and sizes of snag and down log for each PVG incorporated the needs of species dependent on these habitat attributes. This reduction is not a concern for viability in this regional area because it is estimated that extent of source habitat for this species in ERU 13 has increased from historic times by 21 percent (Wisdom et al. 2000). The reduction in the fourth decade accounts for only 7 percent of the habitat within the Ecogroup area, which means the habitat extent would still be well above historical estimates.

Figure W-10. Estimated Acres of Pileated Woodpecker Habitat by Alternative Over Fire Decades



White-headed Woodpecker - See analysis under *Sensitive Species*, above.

Other Species of Concern

Five additional species at risk within the Columbia River Basin based on the Wisdom et al. (2000) analysis were evaluated with SPECTRUM model outputs: Vaux's swift, Williamson's sapsucker, brown creeper, Hammond's flycatcher, and the black-backed woodpecker. Results showed improving habitat trends for all these species because of increasing amounts of large tree structure based on habitat trending toward desired conditions that is within HRV and management direction in the revised plans that reduces known threats that are within Forest Service administrative control. A more complete analysis of these species and effects is contained in the Terrestrial Habitat and Species Technical Report (2003), in *Species at Risk Analysis within the Southwest Idaho Ecogroup, Boise NF, Payette NF, and Sawtooth NF*.

An estimated 27 species of birds are breeding in priority habitats (IPIF 2000) that occur within the Ecogroup area. Some of these species are year-round residents, and others are migratory. The birds that are migratory may be subject to threats (habitat loss, pesticides poisoning, harvest, etc.) on their wintering/summering areas outside of Idaho. Any species of bird that migrates outside of the United States is under the jurisdiction of the Migratory Bird Treaty Act (MBTA). The USFWS has developed a list of species (USDI FWS 2002) relative to the MBTA, but a MOU has not been finalized with the Forest Service and the Fish and Wildlife Service on how these species will be addressed during project analysis. Proposed management activities may have effects to these migratory species. For example, fire use in the spring may unintentionally destroy ground-nesting and snag-nesting sites. However, such actions may also provide long-term habitat improvement for the same species in the years following the initial burning. Snag removal near building and power-lines because of human safety concerns may negatively affect cavity nesters in this group. Burning, and other vegetative management activities that have similar effects, only take place on a relatively limited extent of Forest Service administered lands on a yearly basis.

Cumulative Effects

Endangered and Threatened Species

Gray Wolf - The gray wolf has a circumpolar distribution in the northern latitudes. It occurs in Europe, Asia, and North America. In North America it is considered common in Alaska and most of Canada. Within all recovery areas in the U.S., the populations have been increasing, with the largest populations in Minnesota, Michigan, and Wisconsin.

Gray wolf populations have been increasing on all three Forests and within the Central Idaho Recovery Area since their re-introduction to central Idaho in 1995-96. This trend will likely continue over the short term due to high prey populations, decreasing roads densities across the Ecogroup, management direction to protect denning wolves (see Direct and Indirect Effects by Alternative), and the formation of new packs. However, as populations increase they will also disperse farther and farther from the Central Idaho Recovery Area in order to establish new territories and packs. This dispersal will bring them into increasing contact with human populations and activities. Over the long term, human social pressures will most likely restrict the distribution of wolves to areas of limited human occupation and away from concentrated domestic livestock production. Human tolerance and lack of persecution will be needed to achieve long-term successful recovery. Both regulatory and educational efforts will be important parts of wolf conservation and management efforts.

Bald Eagle - The bald eagle occurs in most regions of North America. It is considered common in Alaska and Florida. Populations have been increasing during the last 10-15 years in all areas where they occur in North America. In Idaho during 2001, eagles occupied 135 nesting territories, and 80 of these nests successfully fledged young. Nesting success in Idaho has been increasing during the last ten years, and that trend is expected to continue. The increasing population trends have been attributed to the banning of DDT in 1972 and management directed at protecting nesting habitat and birds. The USFWS has proposed to de-list the bald eagle in specific recovery areas because of the long-term positive population trends that are expected to continue.

Bald eagle nest and use areas occur on National Forest and other landownerships where large water bodies (lakes, reservoirs, and larger rivers) occur. Actions such as vegetation management, fish population regulation by state agencies, and reservoir level and river flow management (by the Bureau of Reclamation, Idaho Power, other agencies, and irrigators) can have positive or negative effects on bald eagle habitat and populations. Also, some eagles that nest in the Ecogroup area spend their winters elsewhere. These wintering areas may be on lands not administered by the Forest Service, and may not be managed for the benefit of wintering bald eagles. Populations continue to increase in most of the five recovery areas in the United States.

Northern Idaho Ground Squirrel - Northern Idaho ground squirrels inhabit three Management Areas on the Payette National Forest that also include other land ownerships. This species is also believed to have occurred on portions of the Boise National Forest. Approximately half of the known populations occur on lands administered by the Payette National Forest. Agreements are in place with federal and some non-federal landowners to protect and restore ground squirrel habitat, but this area is limited in extent on non-federal ownerships. A number of habitat improvement projects have been implemented since the Conservation Strategy and Agreement was signed in 1996, involving both federal and non-federal partners. However, cumulative impacts from habitat modification, livestock grazing, private construction, natural predation, shooting and trapping remain a concern for this species' viability, particularly with regard to the extremely low and isolated populations that remain.

Canada Lynx - The lynx has a circumboreal distribution. In North America, the lynx ranges across nearly all of Canada and Alaska, and extends south into the northern, forested United States. In the western U.S., lynx are known to occur in Washington, Idaho, Montana, and Wyoming. Lynx are known to occur in the Ecogroup area in the recent past and are expected to still be present. Wisdom et al. (2000) estimate a 14 percent increase in source habitat for lynx habitat within the Columbia River Basin and 12 percent increase in the Central Idaho Mountains ERU over historical extent.

Lynx likely inhabit areas on National Forest and other adjacent ownerships including private, state, and other federal administration; however, much of their habitat is on higher-elevation lands administered by the Forest Service. Vegetation management on non-Forest Service lands may not consider the needs of the lynx or its primary prey species. Lynx in this part of their range may also be limited by non-habitat factors such as hunting, trapping, collision with vehicles, low population size, and competition with other predators. Limited local knowledge about lynx population size, density, and distribution suggest that lynx are rare within the southern portion of the species range. Forest Plan direction has been added to manage for and protect lynx and prey habitat, but even if such efforts are successful, they may not result in a noticeable increase in any local lynx populations that may currently exist. However, these management strategies could have a cumulative beneficial effect over this portion of the species range and the much larger area that is covered by the LCAS. The recent re-establishment of the gray wolf may also benefit the lynx by reducing other predators, like the coyote, that compete with the lynx for snowshoe hares.

<u>Candidate Species</u>

Yellow-billed Cuckoo - Yellow-billed cuckoo nest and use areas on National Forest and other land ownerships where extensive areas of cottonwood riparian forests occur. Most of this type of habitat in the western U.S. is in private ownership because of its desirability for agriculture production and livestock grazing. Extensive areas of this type of habitat were lost during reservoir construction, which was commonplace in the Western U.S in the early part of the last century. Additionally, actions such as vegetation management, livestock grazing, and reservoir level and river flow management (by the Bureau of Reclamation, Idaho Power, other agencies, and irrigators) can have positive or negative effects on Yellow-billed Cuckoo habitat and populations. Also, Yellow-billow Cuckoos that may nest in the Ecogroup area spend their winters in Central and South America. These wintering areas are typically not on lands administered by federal agencies, and may not be managed for the benefit of cuckoos.

Recently De-listed Species

Peregrine Falcon - The peregrine falcon has an almost worldwide distribution. The American peregrine falcon occurs throughout much of North America, from the sub-arctic boreal forest of Alaska and Canada south to Mexico. Peregrine falcons are now found nesting in all states within their historical range, except a few eastern states.

This species will most likely be added to the Regional Forester's Sensitive Species List when it is updated in order to ensure that Forest management proposals do not negatively affect improving population trends. Peregrines will likely receive similar protection on BLM lands. The recent apparent increase in the number of pairs of the western subspecies at the population level are being alleviated or have been reduced (USDI FWS 1999).

Sensitive Species

Wolverine - The Wolverine has a circumboreal distribution. In North America, the wolverine extends across Canada and Alaska, and uses forested and non-forested environments. In the western U.S., they are known to occur in Washington, Idaho, Montana, and Wyoming. They are considered a Regional Forester sensitive species in Regions 1, 2, 4, and 6. Wisdom et al. (2000) estimate a 14 percent increase in source habitat within the Columbia River Basin and a 32 percent increase in the Central Idaho Mountains ERU over historical conditions.

Because most wolverine habitat occurs on high-elevation and remote Forest Service administered lands, few cumulative effects are expected from lands under private, state, or other federal administration. Although different combinations of MPCs in the alternatives would allow different levels of management activities within the Ecogroup area, it is doubtful that wolverine habitat would ever receive a very high level of commodity-oriented activities under any alternative, due to the remote and rugged terrain, the short growing season, and the relative low values of timber and forage resources. Even mineral values, which are relatively high in localized portions of wolverine habitat, are somewhat neutralized by the additional production costs in these remote and rugged areas.

Perhaps the biggest threat to wolverines is disturbance from recreation activities occurring in denning areas, as these types of activities (snowmobiling, heli-sking, cross-country skiing, and snow-shoeing) have expanded in recent years and may continue to expand in the future. Although management direction has been provided to specifically address this concern under the action alternatives, violations could still occur and have impacts on the rearing of wolverine young. This situation should be monitored and evaluated, so that any needed adjustments can be made to protect this species over the long term.

Fisher - Fishers are native to North America, with most of their distribution occurring in Canada. Habitat is found in extensive areas of coniferous forest. In the recent past in the United States, fishers have occurred in California, Oregon, Washington, Idaho, Montana, Wyoming, Minnesota, Wisconsin, and the upper New England States. Wisdom et al. (2000) estimate a 20 percent decrease in source habitat within the Columbia River Basin, but a 35 percent increase within the Central Idaho Mountains ERU from historical to current times. Fishers inhabit areas under private, state, and other federal administration; however, much of their preferred habitat is on forested lands administered by the Forest Service. Vegetation management on non-Forest lands may not consider the needs of the fisher or its prey species. This would be of particular concern where management emphasis is on timber growth and yield prescriptions that do not emphasize maintenance of large trees, snags, and coarse woody debris needed for denning sites and prey.

Effects will also occur to fisher habitat from natural processes, both on and off lands administered by the Ecogroup Forests. Natural succession will tend to create additional habitat on unmanaged lands, while disturbance events such as fire, disease, and wind-throw will reduce green forests, but create new snags and coarse woody debris over time. Currently other factors besides habitat limitations are believed to be contributing to the low population levels of fishers. Mortality will likely continue to occur from hunting, trapping, and collision with vehicles.

Boreal Owl - Boreal owls have a circumpolar distribution. In North America, they occur from Alaska east to Newfoundland in boreal forests. Regionally they are found in Oregon, Washington, Idaho, Montana and Wyoming, occurring in high-elevation forests. Wisdom et al. (2000) estimate a 61 percent decrease in source habitat basin-wide, but a 1 percent increase within the Central Idaho Mountains ERU from historical times. Boreal owl habitat is expected to increase within the Ecogroup Forests over the long term under all alternatives, which would contribute to habitat within and near the Ecogroup area. Because much of their preferred habitat is on forested lands administered by the Forest Service, few cumulative effects are expected from lands under private, state, or other federal administration.

Great Gray Owl - The great gray owl has a circumpolar distribution. In North America, it is resident from Alaska south and east across Canada, and south into the Sierra Nevada and Rocky Mountains. Wisdom et al. (2000) estimate a 16 percent decrease in source habitat within the Columbia River Basin, but a 32 percent increase within the Central Idaho Mountains ERU from current to historical times. Therefore, minor short-term reductions in habitat predicted within the Ecogroup area would not likely have a significant cumulative impact on this species. Great gray owl habitat is expected to increase within the Ecogroup Forests over the long term under all alternatives, which would contribute to increasing habitat within and near the Ecogroup area. Great gray owls inhabit areas under private, state and other federal administration; however, much of their preferred habitat is on forested lands administered by the Forest Service. Therefore, few cumulative effects are expected from other land ownerships.

Flammulated Owl - Flammulated owls breed from British Columbia south through the western interior U.S. and into northern Mexico, and they winter primarily in Central America. Wisdom et al. (2000) estimate a 56 percent decrease in source habitat within the Columbia River Basin, and a 52 percent decrease within the Central Idaho Mountains ERU from historical to current times. Although all action alternatives would increase flammulated owl habitat to varying degrees over the long term, predicted short-term reductions in habitat are a concern for this species that has already lost so much habitat compared to estimated historical conditions. Special consideration will therefore be needed for projects that could potentially reduce flammulated owl habitat on the Forests.

Flammulated owls inhabit ponderosa pine, Douglas-fir, and mixed conifer stands with aspen that occur on National Forest and other federal, private, and state land ownerships. Vegetation management on other ownerships has not featured the retention of large trees and snags in the past, and it may not in the future. It is therefore assumed that Forest Service administered lands will likely contribute the most to re-establishment and maintenance of these important habitat attributes. Also, this species is migratory, so a change in population may not represent changes in habitat conditions on the Forests. Populations may be influenced by activities off Forest, particularly in areas where they may be wintering in Central America.

White-headed Woodpecker - White-headed woodpeckers are resident in southern British Columbia, central Washington and Oregon, Montana, Idaho, and into southern California. Wisdom et al. (2000) estimate a reduction of 61 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU, and a 62 percent decrease within the Columbia River Basin. Under all alternatives but 1B, white-headed habitat is expected to increase within the Ecogroup Forests over the short and long term, which would contribute to restoration of deficient habitat within the Ecogroup area and ERU. White-headed woodpeckers inhabit ponderosa pine areas that occur on National Forest and other federal, private, and state land ownerships. Vegetation management on other ownerships has not featured the retention of large trees and snags in the past, and it may not in the future. It is therefore assumed that Forest Service administered lands will likely contribute the most to re-establishment and maintenance of these important habitat attributes.

Northern Three-toed Woodpecker - The Northern Three-toed Woodpecker occurs in North America from Alaska south through Canada along the western mountains into Arizona and New Mexico. This species usually occurs in higher-elevation forests that are dominated by smaller-diameter trees. They are considered opportunists that take advantage of fire, insect, and disease tree mortality within forests. Their numbers increase in areas of recent tree mortality due to insect or wildfire activity. Most of the higher-elevation forests this species uses are under Forest Service administration and to some extent the National Park Service. Wisdom et al. (2000) estimate a 24 percent increase in source habitat within the Columbia River Basin, and a 77 percent increase within the Central Idaho Mountains ERU from historical to current times. Therefore, minor short-term reductions in habitat predicted within the Ecogroup area would not likely have a significant cumulative impact on this species. Three-toed woodpecker habitat is expected to increase within the Ecogroup Forests over the long term under all alternatives, which would contribute to increasing habitat. This improvement of habitat is expected because of anticipated increasing levels of tree mortality and areas burned by wildfire with minimal salvage efforts in high-elevation forests. Many of the large fires in the western U.S over the past several years should benefit this species also. Because much of their preferred habitat is on forested lands administered by the Forest Service, few cumulative effects are expected from lands under private, state, or other federal administration.

Northern Goshawk - The northern goshawk ranges throughout the northern forests of North America, Europe, and Asia. In North America, goshawks breed in Canada, extending south through the mountains of western U.S. into northern Mexico. Wisdom et al. (2000) estimate a 43 percent decrease in source habitat basin-wide, and a 7 percent decrease within the Central Idaho Mountains ERU from historical to current times. Goshawks also occur on the southern portion of the Sawtooth National Forest, which is not in the Central Idaho Mountains ERU. Minor short-term reductions in habitat predicted within the Ecogroup would not likely have a significant cumulative impact on this species. Goshawk habitat is expected to increase within the Ecogroup Forests over the long term under all alternatives, which would contribute to the source habitat within the ERU that is slightly below estimated historical levels at present.

Goshawks inhabit ponderosa pine, Douglas-fir, mixed conifer stands and aspen that occur on National Forest and other federal, private, and state land ownerships. Vegetation management on other ownerships has not featured the retention of nesting and post-fledgling areas in the past, and it may not in the future. It is therefore assumed that Forest Service administered lands will likely contribute the most to restoration and maintenance of these important habitat attributes.

Columbian Sharp-tailed Grouse - The Columbian Sharp-tailed grouse occurs in southwestern Canada, Washington, Oregon, Idaho, Montana and Wyoming. Much of their low-elevation historical habitat has been converted to agriculture production. Forest Plan direction under the action alternatives would likely maintain or restore sharp-tailed grouse habitat on Forest administered lands, most of the habitat is considered wintering. However, most grouse summer habitat occurs at lower elevation on other federal, private, and state administered lands. Removal or conversion of shrubland communities used as wintering habitat would further reduce habitat for the sharp-tailed grouse. Wheat is a common crop grown on private land areas that were once sharp-tailed grouse habitat. This habitat conversion to intensive agricultural use can negatively affect this species, especially if it occurs on wintering areas.

Sharp-tailed populations statewide have been increasing over the past twelve years, but most populations are still small and isolated. Most of this increase has been attributed to the Conservation Reserve Program (CRP) on private lands (Apa 1998, Wisdom et al. 2000). These birds are making extensive use of these plantings that are maintained in permanent grass/shrub cover all year long, year after year. In some locations, these CRP fields are adjacent to the Sawtooth National Forest. Because these areas are in private ownership, once the CRP contracts expire these areas may be converted back to croplands that sharp-tailed grouse do not generally benefit from. Due to recent drought condition in the Western U.S., these CRP areas were allowed to be grazed or hayed, which is not desirable for this species. There is a risk to continued persistence and viability because most of the spring and summer habitat used by this species is not under the administration of the Forest Service. Also some of the populations are small and isolated, putting them at additional risk to long-term persistence.

Mountain Quail - Mountain quail reside from Vancouver Island, British Columbia south to northern Baja California, ranging into southeastern Washington, eastern Oregon, western Idaho, and central Nevada. Wisdom et al. (2000) estimate a reduction of 12 percent in source habitat from historical to current times for this species within the Central Idaho Mountains ERU. Cumulatively within the Columbia River Basin, there is a 16 percent increase (Wisdom et al.

2000). It is believed that populations can be reduced by habitat degradation caused by human activities such as development and livestock overgrazing in riparian areas. Development and overgrazing are expected to continue on other ownerships, which will further degrade mountain quail habitat; however, RCA direction should provide adequate on-Forest protection for this species. There is a risk to continued persistence and viability because most of the low-elevation habitat used by this species is not under the administration of the Forest Service. Also, some of the populations are small and isolated, putting them at additional risk to persistence.

Harlequin Duck - The Harlequin duck occurs from British Columbia south into Washington, Oregon, Idaho, Montana, and Wyoming. They winter on the west coast and move inland to breed and nest. Harlequin ducks are not known to breed or nest within the Ecogroup area. The birds may be present briefly in the spring, when they pass through to their breeding and nesting locations outside the Ecogroup area. The riparian areas they use during their migration would be protected by Forest Plan management direction for riparian areas. Management activities outside the Ecogroup have had, and will continue to have, a much stronger influence on harlequin ducks and their habitat.

Spotted Bat - This species in known from central Mexico north to southern British Columbia and east to Texas. Spotted bats are known from the southwestern portion of Idaho, south of the Snake River (Groves et al. 1997). They are also known from Twin Falls County north to the Middle Fork of the Salmon River (personal com. L. Lewis 2000). New methods of surveying and detecting this species have recently become available, which should better determine its distribution in the state. Little is known on wintering locations. Spotted bats are known to mostly use crevices of high cliffs for roosts. This type of habitat occurs within the Ecogroup area in steep basalt and limestone canyons, and also outside the Ecogroup area. This species is sensitive to human disruption to maternity roosting and will abandon roost sites, which may increase mortality to its young. Under all action alternatives, management direction has been added to the revised Forest Plans to protect these features on National Forest System lands. Off-Forest, some habitat that was usable by this species has been turned into reservoirs. Also, some areas adjacent to cliffs have been converted to agriculture, which does not meet the foraging requirements of this species.

Townsend's Big-eared Bat - This species ranges from southern British Columbia to southern Mexico and east to West Virginia in areas with deep canyons and high cliffs. This bat is considered common in the western U.S. In the eastern U.S., this species is listed as endangered. These bats are known to use buildings, caves, snags, and mine tunnels for roosting and hibernacula. Roosting and hibernacula sites are very important to the well being of this species. Under all action alternatives, management direction has been added to the Ecogroup Forest Plans to protect these features on National Forest System lands. However, buildings, caves, and mine tunnels occur on other ownerships where the presence of bats is not considered desirable. Human tolerance and lack of persecution will be needed to achieve long-term successful acceptance of this species because of its use of human habitations. Important habitats used by this species may not be protected on other ownerships, and this would negatively affect Townsend's big-eared bats.

Spotted Frog - The spotted frog is found in ponds and slow moving water from western Canada south through Idaho, eastern Washington and Oregon, and into northern Nevada and Utah. Spotted frogs use wet areas with standing water. Riparian areas, lakes, and wetlands are protected under all alternatives by management direction. Executive Order 11190 also limits the loss or conversion of this type of habitat. Off-Forest, much of this frog's habitat is in private ownership because of the presence of impounded or standing water. Many wetlands have been turned into irrigated fields and converted to agricultural uses, because of the availability of water. Also, one of the major threats to the species is thought to be competition from non-native amphibians and introduced non-native fish, more of which occur on lower-elevation private, BLM, and state lands. It is, therefore, assumed that Forest Service administered lands will likely contribute greatly to maintaining or improving important frog habitat.

Common Loon - The common loon has a circumboreal distribution and is known to breed in Finland, Northern Siberian, Alaska, Greenland, Iceland and Canada and most of the northern states in the U.S. that boarder Canada. There is an isolated population of loons in the Greater Yellowstone area of Idaho, Montana and Wyoming. The birds in this area winter on the west coast of the Pacific Ocean and move inland to breed and nest. Loons have been threatened by unregulated harvest, chemical contamination from mercury, oil spills on their wintering areas, and shoreline development in nesting habitat. Excessive human disturbance during nesting can also be detrimental to loons. Because relatively few occurrences of loons and no loon nest sites have been observed within the Ecogroup, it is assumed that management actions within the Ecogroup Forests would have little if any negative effect on current populations. If loons begin nesting on the Forests in the future, riparian area protection and direction for sensitive species provided by the revised Forest Plans should benefit this species.

<u>Management Indicator Species</u>

Sage Grouse - Sage grouse are native to western North America, historically occurring within the eleven western states that have extensive areas of sagebrush steppe habitat meeting habitat requirements. Sage grouse have been extirpated in Arizona, British Columbia, Kansas, Nebraska, New Mexico, and Oklahoma. In areas where they are still present, trend counts have been decreasing since the 1950s. Sage grouse are expected to continue to decrease over their current range because of habitat loss and degradation. Degradation is being caused by conversion of native habitat to intensive agricultural uses, the increasing spread of non-native plants, improper livestock grazing and urban development.

Wisdom et al. (2000) estimate a 27 percent decrease in source habitat basin-wide, an 11 percent increase within ERU 13, a 13 percent decrease in ERU 10, and a 53 percent decrease in ERU 11 from historical to current times. Sage grouse inhabit areas that occur on National Forest and other federal, private, and state land ownerships. Vegetation management on these other ownerships may not take into consideration the needs of sagebrush-dependent species. Mortality can occur from insecticide spraying and hunting, as well as collision with vehicles. Much of the habitat occupied by sage grouse is susceptible to the spread and invasion of non-native plants, which alters the understory communities of shrub/steppe habitat. Within Forest Service administered lands, habitat is still available for this species, but within the entire Snake River Valley there has been a significant reduction. Loss on this large scale will likely persist into the future. Therefore, Forest Service administered lands will play a major roll in maintaining habitat for species dependent on sagebrush for some stage of their life history. Management areas that have the greatest extent of altered sagebrush need special management consideration when proposed activities would have the potential to change the structural stages of sagebrush on Forest Service administered lands.

White-headed Woodpecker - See analysis under *Sensitive Species*, above.

Pileated Woodpecker - The pileated woodpecker is native to North America. They are found in forested portions of all the eastern states. They are also known to occur across southern Canada. In the western states they occur in Washington, Oregon, California, Nevada, Montana and Idaho in forests that can grow large-diameter trees. Wisdom et al. (2000) estimated a 21 percent decrease in source habitat basin-wide and a 21 percent increase within the Central Idaho Mountains ERU form historical to current times. The species has a viability concern at the basin scale, though, because it has been estimated that a 21 percent decrease within the Columbia River Basin has occurred (Wisdom et al. 2000). Breeding Bird Surveys in Idaho, which show an increasing presence of this species from the recent past in areas surveyed, support the conclusions of Wisdom et al. (2000) that habitat has increased. Pileated woodpeckers inhabit areas under private, state and other federal administrations; however most of their habitat is on forest lands administered by the Forest Service. Therefore, limited cumulative effects are expected from other land ownerships.

<u>Species of Special Interest</u>

Rocky Mountain Elk - The Rocky Mountain elk is native to North America. It is common in all the western states and north into the Canadian Rockies. Elk numbers throughout the West are at high population levels based on records of state wildlife agencies during the last 50 years. In Idaho the trend is similar, with an all-time high record harvest of elk during the 1999 and 2000 hunting seasons. The high population levels are attributed to several factors, including recent mild winter weather, controlled harvest, and a better understanding of hunter access and how it relates to elk mortality during the hunting season. The recent re-establishment of the gray wolf will likely have some effect on local elk populations, but elk are expected to remain abundant due to their social and economic importance, management emphasis by state wildlife agencies, and the adaptability of the species.

Access to other non-federal ownerships during the hunting season can also influence elk populations. The percentages of these ownerships vary within the different game management units. State wildlife agencies can change the number of harvest permits allocated, season lengths, and sex to be harvested by game management units, which can also affect populations.

Within the Ecogroup area, state elk population objectives are shown in Table W-7. Of the 27 game management units, seven are not currently meeting population objectives. These seven need to be evaluated to better determine what factors are keeping them below desired population objectives. These units would be a starting point to analyze if additional access management would bring populations within objectives. Additionally, there are 10 units where elk population objectives are being exceeded. These units could be considered for modification of existing motorized access restrictions to help bring the population within desired objectives. Motorized access management must consider other land ownerships that roads traverse and allow legal access. Most State Fish and Game Units contain multiple ownerships of National Forest System, other federal, state, and private land. Forest Plan management strategies would not have a significant cumulative impact on this species, because population numbers would still be above historical estimates. Elk inhabit areas under private, state and other federal administrations; however most of their habitat is on lands administered by the Forest Service. Therefore, limited cumulative effects are expected from other land ownerships except for potential urbanization or conversion to agricultural use of localized wintering areas.

Bighorn Sheep - Bighorn sheep are native to western North America, from British Columbia to Mexico. Within this area several sub-species occur. Populations have been greatly reduced throughout this range from once common abundance. It has been estimated that, within the Columbia River Basin, half of the bighorn sheep habitat currently contains no bighorn sheep. The majority of bighorn sheep habitat in Idaho is on lands administered by the federal government. Bighorn sheep populations are influenced by numerous factors other than habitat. The largest populations declines likely resulted from diseases transmitted from domestic sheep and over-harvest during settlement of the region 150 years ago. The current harvest of bighorn sheep is strictly controlled by state wildlife agencies. Re-introduced bighorn populations have become established and are expected to expand, but only in those habitats where domestic sheep are absent or confined because of potential disease concern.

Bighorn sheep populations within the Ecogroup area have declined dramatically over the last 150 years. The threat to bighorn sheep from domestic sheep disease still exists where private farm flocks of domestic sheep or goats occur within bighorn habitat or in close proximity. Population size and connectivity can also be limited by habitat modifications on private lands, expansion of urban areas, and construction of multi-laned highways and reservoirs. Current populations in the Hells Canyon NRA and Salmon River Canyon areas have the best potential for expansion due to the large amounts of continuous habitat and the relatively low amounts of domestic sheep within these two areas. The domestic sheep grazing in Idaho near the Hells Canyon NRA is still a disease transmission issue due to the mobility of bighorn sheep and potential for disease spread. In the other two areas, the White Clouds and Cassia Division, populations will likely remain small due to their habitat being isolated from other bighorn sheep habitat, their populations being relatively small and more susceptible to predation, and the relative close proximity of domestic sheep and goats on private lands.

Snowshoe Hare - Most of the boreal forest that comprises snowshoe hare habitat in the Ecogroup occurs within Forest Service administered lands. Hares have been negatively affected by long-term fire suppression activities in the boreal forest. Fire suppression has caused the forest to become older with reduced amounts of early successional stages, which the hares depend upon for both food and cover. Tree thinning in the boreal forest can reduce the quality of both food and cover. Thinning also reduces the time that these stand conditions meet hare needs. Trails open to snowmobile use have allowed additional predators (mountain lion, bobcat, and coyote) to access these areas and capture hares during the winter when these predators would not be expected to utilize boreal forest because of snow conditions. Under all action alternatives, Forest Plan direction has been added to address these concerns. These changes would likely have significant cumulative positive impacts on snowshoe hares or their habitat within the range of the lynx, because of implementing direction in the LCAS.

Other Species of Concern

An estimated 27 species of birds are breeding in priority habitats (IPIF 2000), these habitats also occur within the Ecogroup area. These same habitats also occur on other ownerships throughout the west. Some of these species that use these habitats are year-round residents, and others are migratory. The birds that are migratory may be subject to threats (habitat loss, pesticides poisoning, harvest, etc.) on their wintering/summering areas outside of Idaho. A change in abundance for these species may not relate directly with habitat conditions in just within the Ecogroup. Any species of bird that migrates outside of the United States is under the jurisdiction of the Migratory Bird Treaty Act. The USFWS in 2002 developed a list of species (Birds of Conservation Concern) relative to the MBTA, but the Forest Service and the USFWS have not finalized a MOU on how these species will be addressed at the project level (USDI FWS 2002). Management activities may have affects to these migratory species. For example, fire use in the spring may unintentionally destroy ground-nesting bird nests, yet may provide long-term habitat improvements for the same species in post-burn years. Snag removal near building and power-lines because of human safety concerns may negatively affect cavity nesters in this group. Burning and other vegetative management activities are commonplace on other ownerships and may have the same effects. Wildfires may also have the same type of effects, reducing the nesting habitat for some migratory species temporarily, while improving the habitat for these or other species over the long term.

Fire Management

INTRODUCTION

The Role of Fire

Fire is an ecological process—similar to wind, insects, disease, or floods—but unlike these other processes, fire is also used as a tool by the Forest Service and other agencies to manage natural resources. Therefore, land managers plan for fire use, whether it is through prescribed fire (ignited by humans), or wildland fire (ignited by lightning), to achieve management objectives. These objectives often include modifying fuels to reduce the risk of wildfires or to achieve desired vegetative conditions, treatment of fuels generated from management activities, and wildlife habitat improvement. Use of fire to achieve management objectives intentionally or unintentionally affects ecosystem processes and can mimic the effect of historical disturbances.

Forest fire management programs oversee all aspects of fire use and fire suppression. Fire suppression actions are conducted on wildfires (defined by policy as an "unwanted wildland fire"). Wildfires include fires started by humans other than agency personnel, lightning-ignited fires that are not managed for wildland fire use, or prescribed and wildland fires managed for fire use that are no longer meeting the prescriptive criteria. Fire suppression includes a full range of options, from very resource intensive (large numbers of personnel and equipment) to less intensive activities (few personnel and minimal equipment). The decision to use one or a combination of options over others depends on many factors, including threats to life, property, and investments; fuel and weather conditions; natural resource concerns; terrain; and available resources such as personnel and equipment.

Wildland-Urban Interface

Wildland-urban interface is the line, area, or zone where structures and other human developments meet or intermingle with wildland or vegetative fuel. Population growth, particularly in the West, has led to an increase in interface areas. More people are living in small communities and commuting to work in larger metropolitan areas. Isolated subdivisions adjacent to larger communities are also being developed. In recent years the number of communities threatened or affected by wildfire has increased. To address this concern, as well as concerns about effects of wildfires on natural resources, the Secretaries of Agriculture and the Interior were directed to develop a strategy to address severe wildland fires, reduce fire impacts on rural communities, and ensure effective firefighting capability in the future. This strategy—which includes national strategic and implementation goals and plans, budget requests and appropriations, and agency action plans—is known collectively as the National Fire Plan.

The presence of interface affects all fire management decisions in interface areas. While a wide range of fire management options are available by policy, these options are usually narrowed in interface zones due to the concern that the fire may move from federal to private lands. Therefore, suppression costs are often higher adjacent to interface areas, and the ability to manage vegetation, particularly vegetation that historically burned lethally, is sometimes reduced.

Additionally, the risk of human-caused fires originating from the wildland-urban interface zone and spreading to federally protected lands is increasing. These fires often occur during burning conditions that are more extreme than those associated with natural ignitions, and therefore these fires can be more destructive and more expensive to suppress. This is especially true where hazard ratings for vegetation are high to extreme.

Definition of Wildland-Urban Interface

There are many different definitions for wildland-urban interface, including those found in the National Fire Plan. In January and August 2001, a list of "Urban Wildland Interface Communities" was published in the Federal Register identifying National Fire Plan communities of concern in each state. Prior to this list, however, fire management personnel in the Ecogroup had identified sixth-level hydrologic units (subwatersheds) that had one of the following categories of characteristics:

1. Wildland/urban interface—developed areas with private residential structures where many structures border wildland on a broad front.
2. Wildland/rural interface—developed areas with private residential structures where developments are few in number, scattered over a large area surrounded by wildland.
3. Other developments not assigned above, such as administrative sites like guard stations or lookouts that are not privately owned; or privately owned structures that did not fit into categories 1 and 2 above (for example, a single structure or organization camps).
4. No structures.

Subwatersheds rather than point locations were selected for characterizing interface to provide a context for conditions at a broader scale, rather than considering only the area immediately adjacent to interface. This broader scale is important because it helps define treatment areas and strategies that facilitate wildfire suppression before fires become large and difficult to control (Agee et al. 2000, Finney 2001).

Not all subwatersheds that contained structures or that had one of the above characteristics were designated interface. Due to the variability from subwatershed to subwatershed of the number of structures, their location, and how concentrated the developments were, each subwatershed was evaluated by District personnel familiar with the area to make the final determination. In some cases, for example, subwatersheds contained private residential structures, but were not designated as interface because the structures were too far from the National Forest boundary.

The published list of National Fire Plan communities was screened to identify communities that occur within or adjacent to the Ecogroup. These communities were compared against the subwatersheds identified as interface by each Forest (Figures FM-1 through FM-3). In most cases there was good correlation between the interface subwatersheds and those National Fire Plan communities of concern to the Ecogroup. Exceptions included a few communities that occur close to the Forest boundary but where the location of the developments does not influence Forest decisions. Commonly however, more area was characterized as interface than would be identified from the point location of a National Fire Plan community. In general, the interface subwatersheds captured the greater extent of development associated with a National Fire Plan community. In addition, the subwatersheds identified areas of concern to the Forests not listed by the National Fire Plan, such as summer home tracts.

Interface subwatersheds were used in this analysis. Only Category 1 and 2 subwatersheds (listed above under *Definition of Wildland-urban Interface*) were evaluated, because the concerns regarding interface are primarily related to these characteristics.

Figure FM-1.

**National Fire Plan Communities & Wildland/Urban Interface Sub-Watersheds
Boise National Forest**

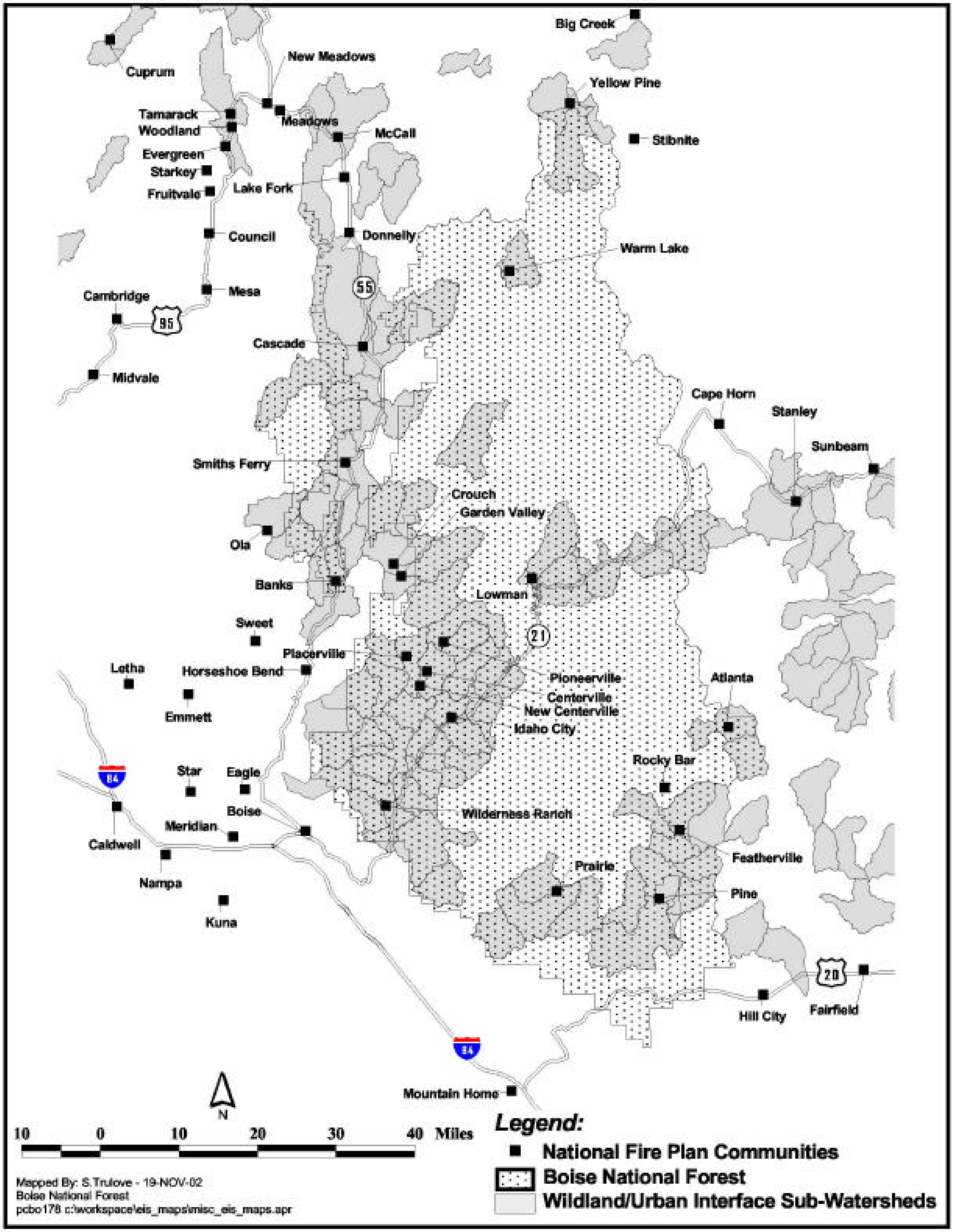


Figure FM-2.
National Fire Plan Communities and Wild land/Urban Interface Subwatersheds
Payette National Forest

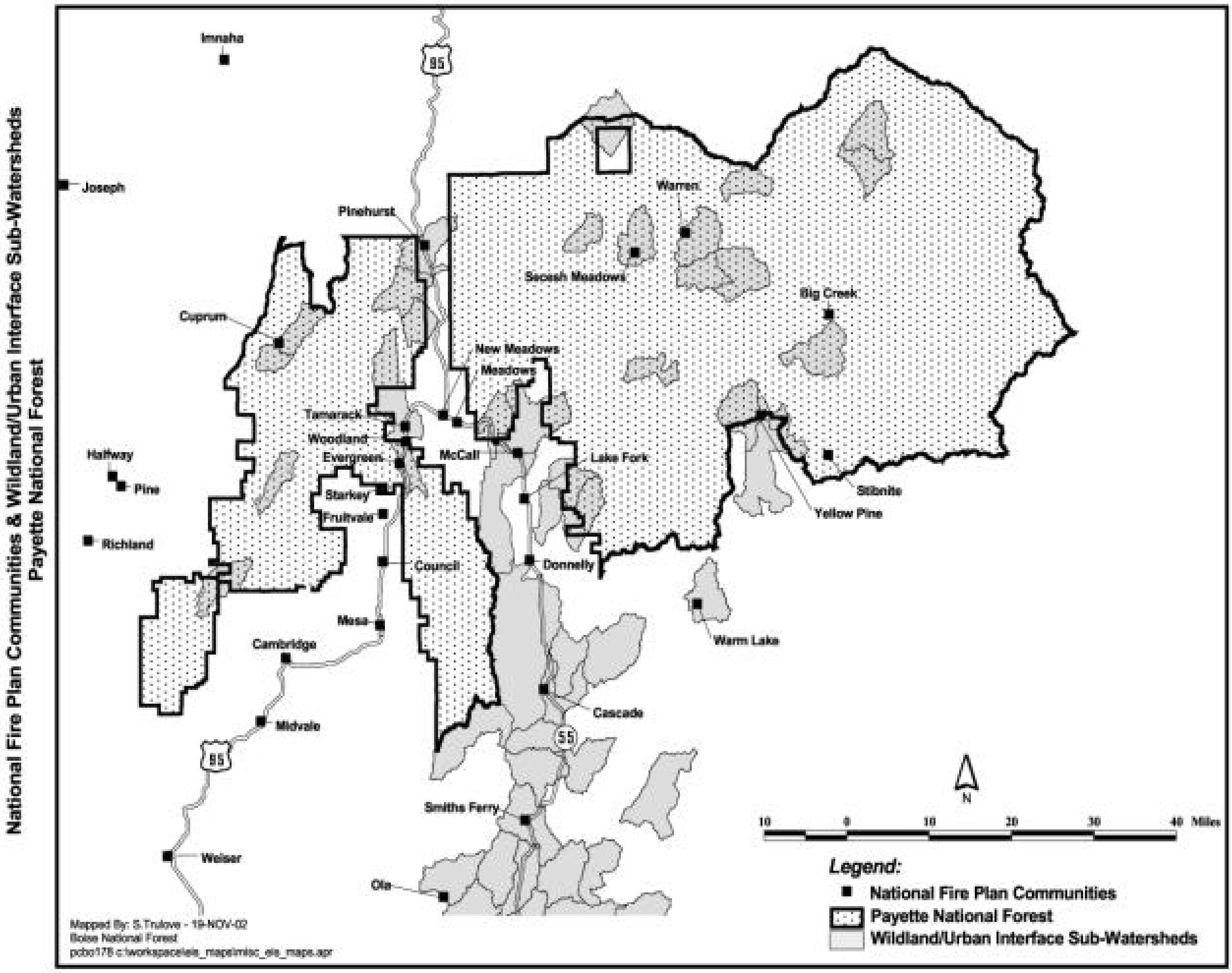
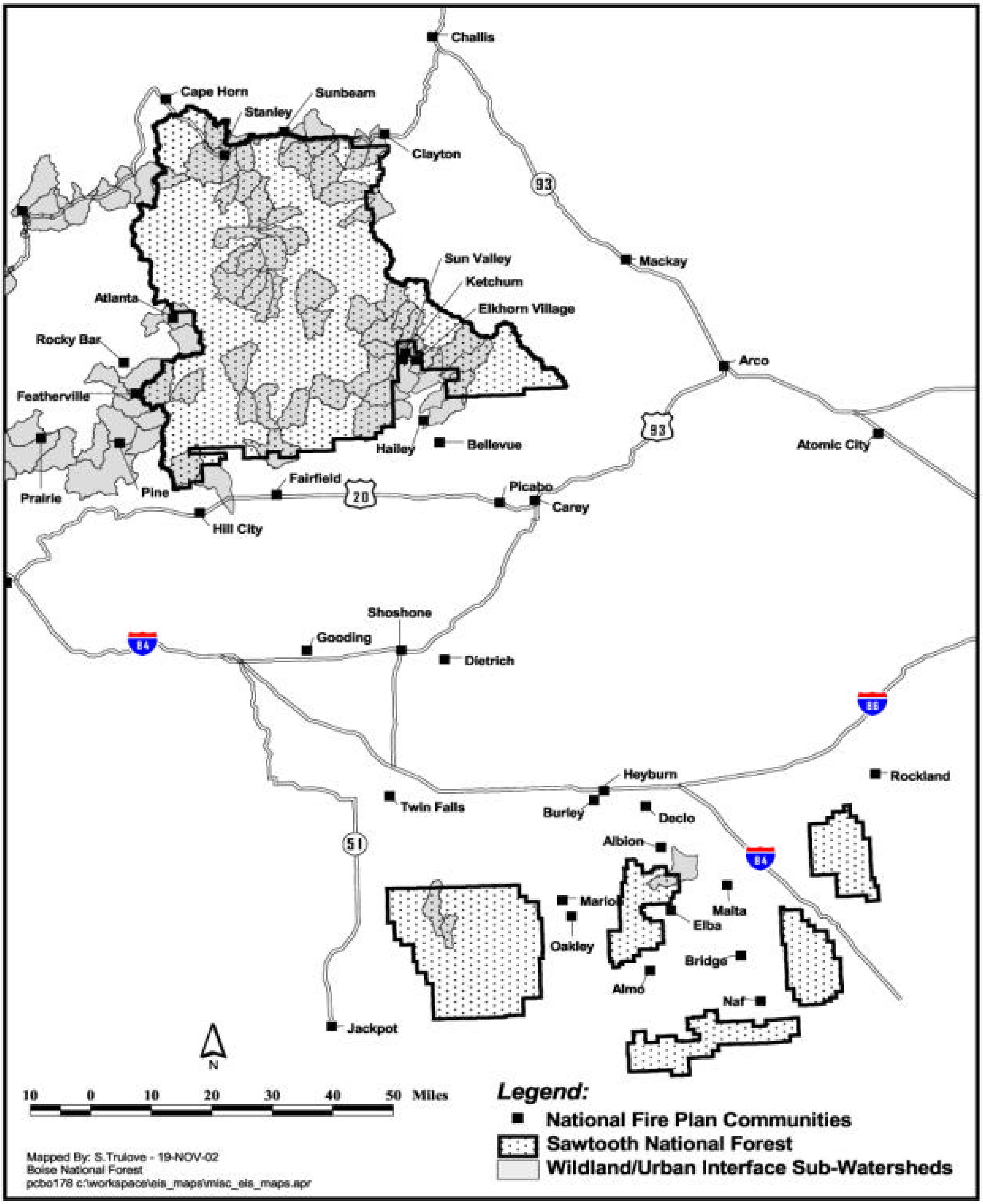


Figure FM-3.

National Fire Plan Communities & Wildland/Urban Interface Sub-Watersheds
Sawtooth National Forest



Issues and Indicators

The effects of the mix of tools on vegetative conditions by alternative are described within the *Vegetation Diversity* and *Vegetation Hazard* sections in this chapter. The effects of these tools on other resources are described in the various resource sections. This section will address the issues described below.

Issue Statement for Issue 1 - The Role of Fire: Forest Plan management strategies may affect the restoration and maintenance of the ecological role of fire on the Forests.

Background to Issue 1: Forest Service fire personnel expressed concerns about meeting the intent of the changes articulated initially in the 1995 Fire Management Policy and Program Review and subsequently in the National Fire Plan. Issues raised to date have included how past land management activities and decisions have affected the role of fire as an ecosystem process, as well as the potential for large wildfires. Generally the public agrees that there is a need to address the risk of large wildfires. However, there is strong disagreement as to what are the appropriate methods to address this concern. Research has shown that fire plays important ecological roles in ecosystem processes and functions such as landscape dynamics, nutrient cycling, and germination or regeneration of many graminoid, forb, or shrub species (Arno et al. 1993, Arno et al. 1995, Covington et al. 1997, Harrington 1996, Kauffman 1990, Lyon et al. 1978, Morgan and Murray 2001, Newland and DeLuca 2000, Romme 1982). Some members of the public felt that using fire rather than timber harvest destroyed valuable timber resulting in lost economic opportunities, reduced wildlife habitat, and increased sedimentation. Others felt that use of timber harvest rather than fire resulted in similar resource effects.

Indicator for Issue 1: The following indicator will be used to measure how well the alternatives restore or maintain the ecological role of fire in ecosystems:

Percentage of acres treated using fire compared to estimated historical acres burned, by Forest **-** Alternatives vary based on the Management Prescription Categories (MPCs) assigned that determine mixes of vegetation management treatments (fire, mechanical, chemical, or combinations). The interaction of MPCs, current conditions, goals, constraints, and desired conditions determines the amount of fire that may be used. In some cases, MPCs limit the use of fire to treat vegetation (e.g., MPC 5.2). In other cases, fire is the only vegetation management tool available (e.g., MPC 1.2).

Issue Statement for Issue 2 - Wildland-Urban Interface: Forest Plan management strategies may affect the amount of vegetation at risk to wildfire, and at what rate hazardous conditions are reduced in areas where there are threats to life and private property (wildland-urban interface).

Background to Issue 2: Concerns regarding interface were raised initially during the 1995 Fire Management Policy and Program Review. The review noted that while fire protection and prevention in wildland-urban interface were not new problems, fuel build-ups and population growth had increased risks. Resources available to suppress wildfires were often spread thin, jeopardizing property, natural resources, firefighter, and public safety. Property losses and expenditures to suppress wildfires were all increasing. These concerns were highlighted during the 2000 fire season when over 8,000,000 acres burned nationally (NIFC 2003). During this fire season 2.3 times more acres burned than the annual average from 1990 through 1999. During the 2000 fire season, 861 structures were lost to wildfire. In 2001, while the acres burned nationally were similar to the 10-year average, 731 structures burned. These wildfires provided poignant examples of wildfire risks in wildland-urban interface and have generated much public concern.

The 2000 fire season resulted in the National Fire Plan, which was developed in part to address the increasing concern about the risks and impacts of wildfires on wildland-urban interface. The National Fire Plan provides a strategic framework for addressing these risks, including identifying the roles of federal, tribal, state, and private land managers and owners in risk management. The plan also provides funding for a variety of actions. These actions include fuels reductions designed to increase the chances of suppressing wildfires while they are still small and of low intensity in areas where large wildfires are a concern. Such reduction will in turn increase firefighter and public safety and decrease threats to communities.

In addition to fuels reduction, the National Fire Plan increases funding for community-based programs like "Firewise" that provide support and education to homeowners regarding the efforts they can undertake to decrease the risk of their homes burning in the event of a wildfire. Research has shown that the potential risk of a structure burning from a wildland fire is highly dependent on the structure's design and materials, and the vegetative conditions immediately surrounding it (Cohen 1999). Two separate studies cited by Cohen found that 86 and 95 percent of the structures with nonflammable roofs and a fuels clearance of 30 feet or more survived lethal fires in California.

The National Fire Plan has highlighted the need for land management agencies to clearly define their role in interface areas, and to develop clear expectations regarding wildland fire before a fire starts rather than after it is burning. Part of this effort includes considering interface during land management planning, particularly as it relates to reducing hazards. In addition, the National Fire Plan identified the need for federal land managers to work with states, counties, and private landowners to clearly identify roles and responsibilities.

Indicators for Issue 2: The following indicator will be used to determine how well alternatives reduce the risk of wildfire within the interface:

MPCs assigned to wildland-urban interface subwatersheds for each alternative and how they address the risk of wildfire (uncharacteristic and those that may result from high resistance-to-control) in forested vegetation by Forest - The current forested vegetation uncharacteristic wildfire hazard index was determined for all subwatersheds (see the *Vegetation Hazard* section for an explanation of the index). Based on the hazard index, subwatersheds were assigned a low, moderate, high, or extreme rating for uncharacteristic wildfire hazard. Hazard indexes for subwatersheds assigned to a Category 1 or 2 interface were extracted as a subset of the forest-wide subwatershed assignments. The *Vegetation Hazard* section provides an indication, by alternative, of the forest-wide changes that occur over time in conditions that contribute to uncharacteristic wildfire hazard. This includes changes in conditions within and adjacent to interface subwatersheds. In the interface subwatersheds, MPCs provide a relative indicator, by alternative, of how much and at what rate vegetation may be treated toward achieving forest-wide reductions in hazardous conditions. This includes treating conditions that contribute to uncharacteristic wildfire hazard or high resistance-to-control.

Affected Area

Direct and indirect effects on the role of fire use and wildfire risk in wildland-urban interface are analyzed on lands administered by the three National Forests in the Southwest Idaho Ecogroup. This area represents National Forest System lands where fire management activities may take place. Cumulative effects for both issues include other land ownerships within and adjacent to lands administered by the three National Forests, particularly in areas of wildland-urban interface. This larger area is considered to incorporate concerns to and from other landowners with regard to the potential effects on or from these intermingled properties. This approach appears to be consistent with the coordination that is expected to take place between the states, counties, other federal agencies, and private landowners under the National Fire Plan.

CURRENT CONDITIONS

The Role of Fire

The total numbers of fire ignitions (lightning and human-caused) were similar for the Boise and Payette Forests; they averaged 154 and 128 per year, respectively, from 1991 through 2000 (see the *Vegetation Hazard* section, Table VH-17). Lightning accounted for 83 percent of the total number of ignitions. The total number of ignitions on the Sawtooth was much lower—an average of 47 per year for the same time period—and lightning only accounted for 55 percent of the total ignitions (21 human-caused versus 26 lightning-caused).

Forested Vegetation Fire Regime Groups

Fire regimes describe the type of fire that generally occurs in an ecosystem. Four fire regimes are defined for the Ecogroup area: nonlethal, mixed1, mixed2, and lethal. Fire regimes are used to describe the types of effects that may result from burning. The mortality, patch sizes, consumption of organics, and other changes that result from nonlethal fire are much more subtle and of smaller scale than the changes that occur from lethal fire (See the *Introduction, Table 3-2* and the Description of Fire Regimes in this section for more information). Mixed fire regimes (mixed1 and mixed2) are intermediate to the nonlethal and lethal.

Ecogroup fire regimes were compared to those defined for the National Fire Plan (Schmidt et al. 2002). National Fire Plan fire regimes are described as fire frequency (the average number of years between fires) and the effect of the fire on the dominant overstory vegetation. The relationship of the Ecogroup to National Fire Plan fire regimes is as follows:

- Nonlethal — I (0-35 year frequency, low)
- Mixed1 — III (35-100+ year frequency, mixed)
- Mixed2 — III (35-100+ year frequency, mixed)
- Lethal — V (200+ year frequency, stand-replacing).

Table FM-1 displays the percentage of total forested acres by historical fire regimes in the Ecogroup area by Forest. The number of acres in each forested fire regime group was determined by assigning Potential Vegetation Groups to fire regimes as follows:

- Nonlethal — PVG 1, PVG 2, PVG 5
- Mixed1 — PVG 3, PVG 6
- Mixed2 — PVG 4, PVG 7, PVG 11
- Lethal — PVG 8, PVG 9, PVG 10.

Table FM-1. Percentage of Total Forested Acres by Historical Fire Regimes in the Ecogroup

Area	I[1]-Nonlethal	III-Mixed1	III-Mixed2	V-Lethal
Boise NF	36	16	32	16
Payette NF outside of the Frank Church - River of No Return Wilderness	27	17	36	20
Frank Church - River of No Return Wilderness	24	7	53	16
Sawtooth NF outside of the Sawtooth Wilderness	3	4	74	19
Sawtooth Wilderness	16	1	56	27
Ecogroup	25	12	45	18

[1]I, III, and V are National Fire Plan Fire Regimes that are equivalent to Ecogroup historical fire regimes.

Assuming an average historical fire return interval for each fire regime (18 years for nonlethal, 36 years for mixed1, 85 years for mixed2, and 103 years for lethal), an estimated 26 percent of the Ecogroup area forested vegetation may have burned each decade. This includes acres that historically burned with nonlethal to lethal intensities. Since 1991, an estimated 23 percent of the forested vegetation in the Ecogroup area has burned; 2 percent from fire use (prescribed and wildland) and 21 percent from wildfire. In many areas, the effects of these wildfires were much different than what would have occurred historically. The *Vegetation Hazard* section in this chapter contains more information about the historical role of fire as it relates to uncharacteristic wildfire hazard.

Non-forested Vegetation Fire Regime Groups

A total of eleven non-forested vegetation types were identified within the Ecogroup area. Four of the eleven are found on the Mountain Home District of the Boise Forest, and all eleven occur on the Sawtooth Forest. There were not enough acres of these vegetative types on the Payette Forest or outside of the Mountain Home District on the Boise Forest to represent in the non-forested vegetation modeling. Therefore, results presented below are for the southern end of the Boise Forest and the entire Sawtooth National Forest.

Non-forested vegetation types were assigned to fire regimes as follows:

- Mixed1 — Wyoming big sagebrush
- Mixed2 — Basin big sagebrush; low sagebrush; mountain big sagebrush; mountain big sagebrush with chokecherry, serviceberry, and rose; mountain big sagebrush with snowberry; mountain big sagebrush with bitterbrush; pinyon-juniper with mountain big sagebrush; pinyon-juniper with Wyoming big sagebrush
- Lethal — Pinyon-juniper; climax aspen

Mountain big sagebrush communities made up all of the non-forested vegetation evaluated on the Boise National Forest. This included cover types where mountain big sagebrush was dominant or co-dominant. Fire regimes in these cover types were defined as mixed2 for the vegetation modeling due to the fire effects on mountain big sage. However, some of the species that occur as co-dominants resprout following burning. In this case, for the community as a whole, fire regimes can vary from mixed1 to mixed2, depending on the species mix. Historical fire frequencies in mountain big sagebrush communities ranged from 15 to 40 years (Tirmenstein 1999).

Non-forested communities on the Sawtooth National Forest are much more diverse than those found on the Boise. Historical fire regimes in non-forested communities on the Sawtooth range from mixed1 to lethal. However, mixed2 fire regimes make up the majority of the area (about 95 percent). The mixed2 fire regimes in the non-forested communities coincide with the National Fire Plan Fire Regime II (0-35+ fire frequency, stand-replacing), and the lethal regimes with Fire Regime IV (35-100+ fire frequency, stand-replacing). Assuming an average historical fire return interval for each fire regime (40 years for mixed1, 20 years for mixed2, and 60 years for lethal), an estimated 44 percent of the Ecogroup non-forested vegetation may have burned each decade.

Current fire regimes in non-forested communities are much different than historical. In the non-forested areas, changes in fire return intervals represent the extremes, from much longer to much shorter than historical. In some areas intervals have been greatly lengthened by fragmentation that has resulted from conversion of areas to croplands and urban developments, fire exclusion, and livestock grazing that removes fine fuels, a primary carrier of fire in these communities. In other areas fire return intervals have been greatly shortened, in some cases to annually, due to the introduction of exotic species like cheatgrass.

Fire Use in the Current Plans

Under the current Forest Plans, fire (prescribed and wildland) is used to meet a variety of resource objectives. Wildland fire use is allowed in some management areas (described in the current plans as either unplanned ignitions or prescribed natural fire), but to date, wildland fire use has not been implemented outside the designated wilderness areas on any of the Ecogroup Forests. Wildland fire use has been implemented in the Frank Church - River of No Return Wilderness, Sawtooth Wilderness, and Hells Canyon National Recreation Area under individual fire management plans specific to those areas. Forest Plan revision proposes no changes to fire use programs in any of these wilderness areas.

Prescribed fire is used to treat fuels generated from timber harvesting or from natural vegetative development. Fire has also been used for site preparation before planting, to improve wildlife forage, or to meet other resource objectives. In the past 5 years, the use of prescribed fire has increased, as allowed within the current plans, due in part to concerns about increased fuels and changes in vegetative conditions that contributed to large, sometimes uncharacteristic wildfires that burned within the Ecogroup area in the 1980s and 1990s.

Wildland-Urban Interface

Of the 771 subwatersheds in the Ecogroup area, 159 were defined as interface. This number does not include developed areas within designated wilderness, as these are addressed in the wilderness planning process. Of the 159 interface subwatersheds, 47 percent are on the Boise, 17 percent on the Payette, and 36 percent on the Sawtooth. Throughout the Ecogroup area, interface occurs adjacent to National Forest System lands that historically were burned by nonlethal to lethal fires. Table FM-2 shows the percent of interface subwatersheds by Forest, and proportions of the subwatershed forested vegetation that were in historically nonlethal or mixed1 fire regimes.

Table FM-2. Percent of Historically Nonlethal or Mixed1 Forested Vegetation Fire Regimes in Interface Subwatersheds

Percentage of Historically Nonlethal or Mixed1 Forested Fire Regimes within Interface Subwatersheds	Percent of Interface Subwatersheds			
	Boise NF	Payette NF	Sawtooth NF	Ecogroup Total
Greater than 75%	25	0	0	11
51 to 75%	36	23	0	20
26 to 50%	28	33	2	20
Less than 25%	11	44	98	49

Of the subwatersheds identified as wildland-urban interface, 25 percent of those on the Boise have more than 75 percent of their forested acres in vegetative communities that historically burned with nonlethal or mixed1 fire regimes; only a few interface subwatersheds have less than 25 percent of the area in historically nonlethal or mixed1 forested fire regimes. None of the Payette or Sawtooth interface subwatersheds falls into the greater than 75 percent nonlethal or mixed1 category. On the Payette, 23 percent of the interface subwatersheds have more than half of their forested acres in historically nonlethal or mixed1 forested fire regimes. However, the largest number of interface subwatersheds occur in areas with the least amount of historically nonlethal or mixed1 fire regimes. Most of the Sawtooth interface subwatersheds fall into the category where the least amount of forested vegetation historically burned under nonlethal or mixed1 fire regimes.

<u>Uncharacteristic Wildfire Hazard and Resistance-to-Control</u>

Subwatersheds were determined to have low, moderate, high, or extreme uncharacteristic wildfire hazard indexes based on vegetative conditions that can contribute to the risk of uncharacteristic lethal wildfire (see the *Vegetative Hazard* section, Figure VH-1). Subwatersheds with a high or extreme uncharacteristic wildfire hazard indexes generally have a higher percentage of historically nonlethal or mixed1 fire regimes that have recently become more lethal due to alterations in stand size, canopy closure, and species composition (Graham et al. 1999). However, a subwatershed assigned to a low hazard index may still have largely lethal fire, and be rated low because this was the historical fire regime. The uncharacteristic wildfire hazard index does not include the risk of all mixed2 or lethal fires because in many areas these regimes are characteristic and therefore do not fit the definition of uncharacteristic wildfire hazard (Brown 2000). An example of this is on the Sawtooth Forest where most of the interface subwatersheds are predominately in mixed2 or lethal fire regimes. In this case, these types of fires are characteristic, but because they are in interface, they are generally undesirable. Wildfires that tend toward lethal generally have high resistance-to-control whether they are burning uncharacteristically or characteristically. Treatment strategies and goals may vary depending on the whether the vegetative conditions that contribute to the risk of wildfire are from mixed2 or lethal fires that are characteristic or uncharacteristic for the vegetative types being targeted.

The majority of the interface subwatersheds with high or extreme forested vegetation uncharacteristic wildfire hazard indexes occur on the Boise Forest (Table FM-3). Here, as well as on the Payette, the majority of the interface subwatersheds have extreme or high indexes. These indexes indicate that vegetative conditions in those interface subwatersheds are such that a wildfire today could have much different effects than fires that burned historically. This is primarily due to increases in stand density and changes in the distribution of size classes or species. In most cases, however, the majority of the uncharacteristic wildfire hazard is generated by shifts from less to more dense vegetative conditions (high canopy closures). The high and extreme hazard conditions are the most departed from historical, and they generally represent a shift from nonlethal or mixed1 fire regimes to mixed2 or lethal fire regimes.

Table FM-3. Percent of Interface Subwatersheds by Forest and Forested Vegetation Uncharacteristic Wildfire Hazard Indexes

Subwatershed Forested Vegetation Uncharacteristic Wildfire Hazard Index	Percent of Interface Subwatersheds			
	Boise NF	Payette NF	Sawtooth NF	Ecogroup Total
Low	3	20	44	22
Moderate	8	20	35	20
High	19	28	21	22
Extreme	70	32	0	36

None of the interface subwatersheds on the Sawtooth Forest have an extreme hazard index although some are high. For the Ecogroup area, the Sawtooth accounts for most of the interface subwatersheds with moderate or low uncharacteristic wildfire hazard indexes. In general, few forested areas on the Sawtooth contain much vegetation that historically burned with nonlethal or mixed1 fire regimes (Table FM-2). Here the majority of the interface subwatersheds were historically mixed2 or lethal. Current fire regimes are more similar to the historical, and therefore, the risk of uncharacteristic wildfire is mostly low. However, this does not mean the risk of wildfire is low. In many areas, vegetative conditions are such that a mixed2 or lethal fire will likely occur in the future.

Resistance-to-control describes the vegetative conditions that, under the same weather and topography, lead to a higher likelihood of fire behavior that makes the fire difficult to suppress. This can include fires that produce uncharacteristic effects as described above, or fires that burn characteristically. However, even for those that burn characteristically, some wildland fires may still be considered wildfires because they are unwanted, due in this case to the presence of wildland-urban interface.

There are a variety of vegetative conditions that contribute to high resistance-to-control. These include high stand densities, large amounts of continuous ground fuels, multi-storied vegetative layers that connect vegetation vertically (ladder fuels), and a high number of more flammable tree species. All these conditions contribute to the risk of crown fires that are often more difficult to suppress (Scott 1998). In addition to areas with high or extreme uncharacteristic wildfire hazard, those areas with resistance-to-control increase the number of subwatersheds that are at risk to lethal wildfire. This risk is greatest for subwatersheds that have large amounts of area in the mixed2 or lethal historical fire regimes. This is the case for many of the interface subwatersheds on the Sawtooth. Here, 98 percent of the interface subwatersheds have less than 25 percent of their forested area in the nonlethal or mixed1 fire regimes (Table FM-2). This conversely means that greater than 75 percent of the forested acres are in the mixed2 and lethal historical fire regimes. On the Payette, 44 percent of the interface subwatersheds are in these historical fire regimes.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Issue 1 – The Role of Fire

<u>Resource Protection Methods</u>

Fire use, though an important ecosystem process, can have adverse effects under certain conditions. Forest Plan direction is intended to help define those situations where fire use will be limited or is not appropriate because of potential adverse resource or social-economic impacts. This is accomplished through goals and objectives to identify areas where fire use is appropriate, or through standards and guides designed to limit fire effects where it is not appropriate. Fire Management Plans identify prescriptive criteria for wildland fire use that best achieves Forest Plan desired conditions and goals, and may contain additional requirements to address local concerns. Additional planning processes, such as the Wildland Fire Situation Analysis or site-specific analysis for prescribed fire, address the potential effects and risks of fire use, including the possibility of an escaped fire. Part of the decision criteria to determine whether a lightning ignition will be managed for wildland fire use is whether the fire will benefit or negatively affect resources, or grow beyond a predetermined boundary.

Fire Use Planning Areas

Forest Plans delineate prescribed fire and wildland fire use areas (*FS Manual 5141.1*). Fire Management personnel familiar with the Forests designated fire use planning areas. The prescribed fire planning area includes all management areas in the Ecogroup. Delineation of Wildland Fire Use planning areas considered proximity to designated wilderness, area size, location of administrative boundaries, adjacency to wildland/urban interface, and other local considerations, and included parts or all of some management areas. The planning areas do not change by alternative. The Forest Plans describe which management areas, or portions thereof, that may implement wildland fire use for the selected alternative. The Fire Management Plan developed to implement the Forest Plan aggregates these areas identified at the management area level and further refines boundaries within the overall planning areas. Criteria will be developed to ensure that implementation of wildland fire use is consistent with Forest Plan direction.

General Effects

Fire contributes to a host of functions and processes in ecosystems. Fire reduces accumulations of organic material, which in turn reduces wildfire hazard (Harrington 1996). Fire recycles nutrients and alters soil chemistry, aids in decomposition, and influences soil structure and stability (Arno et al. 1995, Covington et al. 1997, Kaufmann 1990). Fire alters vegetative characteristics that contribute to coarse- and fine-scale vegetative mosaics (Arno et al. 1993, Romme 1982). Fire also modifies vegetative succession, providing early seral stages important to some wildlife species (Lyon et al. 1978). Fire effects can vary depending on fire intensity, severity, and frequency, the primary factors that define fire regimes.

The effects of not using fire are also the same across the alternatives. Acres not treated (with fire, mechanical, chemical, or combinations) will continue to advance toward climax successional stages, and understory seral species (shrubs and herbs) may decline or become more decadent. Coarse- and fine-scale landscape patterns will become more homogenous as succession advances (Hessburg et al. 2000). Ecosystem processes and functions—like nutrient cycling, in which fire was historically a primary agent—will be affected, as there is no substitute for fire in achieving these effects.

Effects by Management Prescription Category

Vegetation management activities that include fire use are the same for each alternative as defined by the Potential Vegetation Group (PVG) or non-forested cover type and the Management Prescription Category (MPC). That is, the treatments that determine fire use in PVG 2 for MPC 3.1 are the same from one alternative to the next. The PVGs and non-forested cover types were used to represent ecologically appropriate kinds of fire use (replace, reset, or maintain) based on the historical fire regimes. For example, fire in nonlethal fire regimes that burned frequently was primarily used to alter vegetative density (reset) or maintain the current vegetative conditions. Stand-replacing fire was represented only occasionally, as this was considered to occur infrequently under the historical fire regime. In contrast, stand-replacing fires were often applied in vegetative communities that were historically lethal. In addition, a small amount of nonlethal fire was represented in mixed2 and lethal fire regimes, as these kinds of fires were part of the historical fire mix.

The MPCs were used to represent a mix of vegetation treatment tools where appropriate, given the theme of the MPC. (See *Appendix B* for a more detailed description of how tools related to MPCs were represented in modeling.) The effects of fire on vegetation, soils, visuals, etc. described by one PVG or non-forested cover type-MPC combination in any alternative is the same as that combination in another alternative. The differences in fire use between the alternatives are the result of various mixes and amounts of PVG/cover type and MPC combinations.

Description of Fire Regimes

Fire Intensity and Severity in Nonlethal Fire Regimes - Nonlethal fires influence vegetation, soils, nutrients, and other resources. Vegetative compositions tend to stabilize following disturbance within the first 5 to 10 years (Morgan and Neuenschwander 1988, Stickney 1986). Generally by year 5, those species that will make up the majority of the vegetative community will have established either through buried, windblown, or other kinds of off-site seed transport, or by resprouting. Mineral soil exposure, in most cases, is a temporary effect in this fire regime. Typically, soil cover is quickly re-established either by live vegetation or litter. However, where native grasses have been reduced through fire exclusion, live vegetative cover may take more time to develop. One intent of burning in nonlethal fire regimes is to reduce duff and litter accumulations and promote graminoid cover common to these vegetative communities. Over time, the understory vegetation, particularly graminoids, should increase, providing soil covers from live vegetation and litter. Understory shrubs, including rhizomatous and early seral species that develop from seed, will also increase as stand densities decline and top-killing promotes resprouting (Arno et al. 1995, Kauffman 1990). Tree mortality in forested areas will contribute to snag and coarse wood in the years immediately following the disturbance. This may result in an increase in small coarse wood in the short term as smaller understory conifers are killed. In the long term, however, the amount of coarse wood in fine and small fuels should decline, particularly after multiple fire applications, leaving primarily the larger-diameter woody debris.

Fire Intensity and Severity in Mixed1 Fire Regimes - Effects in this fire regime are similar to the nonlethal except that mortality patches are larger and more mineral soil may be exposed. This is due to the vegetative communities that make up the mixed1 fire regime in the Ecogroup area. They contain a higher density of shrubs or are more productive than those found in the nonlethal fire regimes, and therefore can produce more fuels. In forested ecosystems, fire intensities may result in more coarse wood being produced in both the short and long term from greater tree mortality. Exposed mineral soil will likely also be greater due to the higher severity, particularly in areas with high shrub densities. However, graminoid understories are common, and many of the shrubs that maintain high coverage through succession are rhizomatous, or have other mechanisms that allow them to persist after disturbance. Such shrubs include white spirea, common snowberry, ninebark, cherries, gooseberries, and blue huckleberry (Steele et al. 1981). These shrubs can resprout quickly and can increase in density and extent (Crane et al. 1983, Lyon 1971, Owens 1982, Morgan and Neuenschwander 1988), acting to stabilize the soil and produce litter covers.

Fire Intensity and Severity in Mixed2 Fire Regimes - The effects of treating acres in this fire regime are different than the nonlethal and mixed1 fire regimes. Here, fire intensities and severities are greater. By definition, the dominant effect in the mixed2 fire regime is more extensive areas of mortality—from less than 1 acre to almost 25,000 acres in forested ecosystems (Agee 1998)—and larger areas of higher severities. This is particularly common in areas where lodgepole pine or whitebark pine are early seral species. Therefore, these types of fires have greater temporary, short-term, and long-term effects than the nonlethal or mixed1 fire regimes. Due to shorter growing seasons or in some cases, dry conditions, vegetative communities typically take longer to re-establish than in more mesic areas. Therefore, areas of exposed soil can last longer. Also, in forested areas the flux of snags and coarse wood is more erratic than in the nonlethal or mixed1 fire regimes due to the time lag between events, the amount of mortality that occurs, fall-down rates, and even weather conditions (Stevens 1997). However, under-burning is also a component of this fire regime, both temporally and spatially. That is, some areas may be underburned by the same fire that creates a mixed2 mosaic, or one or more underburns may occur in a stand before conditions are such that a subsequent fire is larger and more lethal. The underburning events are more like the effects described for the nonlethal or mixed1 fire regimes.

Fire Intensity and Severity in Lethal Fire Regimes - This fire regime contains forested vegetative communities in which lodgepole pine, climax aspen, or juniper is a dominant landscape species. In some cases, such as PVG 10 (persistent lodgepole pine) or climax aspen, these two species are the only ones that dominate through succession. In this case, fire and sometimes insects or disease work in combination to redistribute landscape mosaics. In other forested vegetative communities included in this group, lodgepole pine is an early seral component giving way to climax species such as Engelmann spruce and subalpine fir. Pinyon-juniper communities are somewhat different in that other species such as grasses or sagebrush may be dominant for a time until excluded by juniper.

Fire intensities and severities are greatest in the lethal fire regimes. Agee (1998) reported patch sizes in this regime can exceed 10,000 acres in forested areas. As with the mixed2 fire regimes, nonlethal or mixed severity fires can also occur intermediate to the lethal events. Several factors contribute to the eventuality of a lethal fire, including the age of landscape mosaics and the species that comprise them, the development of natural fuels, endemic and epidemic insect outbreaks, and weather.

Lethal fires can have the most dramatic effects on the landscape given the high intensities that contribute to large mosaics of dead vegetation. Vegetative establishment in these communities can be slow. In forested communities where lodgepole pine dominates, this can be due to very cold conditions found in frost-pockets, or in excessively wet areas where high water tables occur. In non-forested communities establishment may be slow due to dry conditions, particularly in areas with shallow soils. Therefore, re-establishment of soil covers can take a long time, depending on the vegetative communities present before the disturbance. In some areas, herbaceous species quickly re-establish, either from plants present before the fire or from seed. In other areas, particularly where rhizomatous shrubs occur, these species can resprout, forming a dominant cover that provides soil cover from litter fall over time. In forested and woodland areas, snag and coarse wood development is similar to that described for the mixed2 fire regime but at a larger scale, with more lag time between input events.

Effects of Prescribed Fire Versus Wildland Fire Use

Prescribed fire or wildland fire is used to achieve management objectives such as those described for the fire regimes. Therefore, implementation of either will occur within certain parameters (prescriptions). However, prescribed fire and wildland fire use may be implemented at different times during the burning season and therefore have somewhat different effects. Prescribed fires are often conducted in the spring and fall within burning windows that are developed to ensure that the effects meet resource management objectives. Conversely, lightning produces the ignitions that may be managed for wildland fire use. The conditions with the greatest chance of producing an ignition are dry lightning (lightning that occurs from storms that produce little rainfall in the strike area) and low fuel moistures (Rorig and Ferguson 2002). Within the Pacific Northwest, these conditions occur most commonly in July and August. Therefore, wildland fire use may more often be implemented under drier conditions than those that take place within prescribed fire burning windows. Within a range of desirable effects, fires implemented in the spring or fall are more likely to be of lower intensity and severity than ignitions that occur in the summer. In addition, the potential extent of wildland fires, depending on the location of the ignition, is greater due to these drier conditions. Ignitions that occur in areas with few natural fuel breaks could be extensive and burn for long time periods depending on subsequent weather.

Issue 2 - Wildland-Urban Interface

Development of interface zones would be the same for all alternatives, as most growth is occurring on private lands adjacent to National Forest System lands. There are no anticipated increases in private residential structures on National Forest System lands; for example, in summer home areas. Therefore, the alternatives would have no effect on changes in interface development.

The alternatives would have no effect on suppression actions for private residential structures, as this is determined by policy and will not vary by alternative. National Forest Service policy states that interior and exterior structure fire suppression is the responsibility of the State, Tribal, or local fire departments. However in Idaho, the State does not have legislative responsibility for fire suppression. Therefore the responsible entity is the local fire department. Where a local fire department does not exist, the responsibility for structure suppression lies solely with the property owner. Within the Forest Service's protection area, the primary responsibility is to suppress wildfire before it reaches structures. The Forest Service may assist State and local fire departments in exterior structure fire protection when requested under terms of an approved cooperative agreement.

Response to wildland fire in or adjacent to wildland-urban interface subwatersheds could vary depending on management area direction. For example, an MPC of 1.2 (recommended wilderness) provides for a wider range of Appropriate Management Responses compared to an MPC of 5.2 (growth and yield). In reality, though, the presence of interface will not vary by alternative, and concerns related to threats to life and property may reduce or eliminate actual differences regarding implementation of Appropriate Management Responses, including fire suppression strategies, under any one alternative.

Resource Protection Methods

The primary protection method used in wildland-urban interface in the past has been fire suppression. The potential effectiveness of suppression varies depending on several factors, including weather, fuels, terrain, vegetative conditions, and available suppression resources. One of the goals of the National Fire Plan is to improve fire prevention and suppression efforts in order to reduce risk of loss of life, firefighter injuries, and damage to communities and the environment from wildfires. Another goal is to treat hazardous fuels. Small fires, particularly low-intensity burns in the understory, are much easier to suppress than high-intensity fires that have moved into stand crowns. Therefore, reducing hazards, both in terms of conditions that produce fires that are difficult to suppress (high or extreme resistance-to-control), as well as conditions that lead to uncharacteristic fires, can increase the likelihood of suppressing subsequent wildfires (Omi and Martinson 2002, Wagle and Eakle 1979). This strategy is particularly effective in historically nonlethal and mixed1 fire regimes, as these systems evolved with this type of disturbance, which can be maintained over time (Fulé et al. 2001, Omi and Martinson 2002).

Changing the distribution and continuity of vegetation and fuels on the landscape, particularly in historically mixed2 or lethal fire regimes, can also aid fire suppression efforts by providing fuel breaks or other kinds of conditions where fires can be suppressed (Deeming 1990, Finney 2001, Graham et al. 1999). This change is important because not all interface in the Ecogroup area occurs in areas with high risk of uncharacteristic wildfire; many are found in areas with potential for characteristic lethal fire, which makes suppression efforts more difficult because of conditions that increase resistance-to-control. Species mixes and vegetative development at the stand-level in these types tend toward lethal fire in the long term (Brown 2000, Omi and Martinson 2002). In addition, the presence of interface may reduce opportunities to use vegetation management tools, like wildland fire use, that could reduce vegetative hazard and break up vegetation and fuel continuity on the landscape in these fire regimes.

Vegetative treatments are only one aspect of reducing hazards in the wildland-urban interface. In all cases, the most effective protection methods are those conducted by property owners. These methods include building structures that are less likely to burn, using nonflammable building materials, landscaping with less flammable vegetation or modifying existing vegetation so that it is less hazardous, and developing defensible space.

The ability to meet protection objectives for wildland-urban interface will likely be most influenced by the type of vegetation adjacent to the interface area. Even though the goal is to reduce hazardous conditions and the risk of wildfire, some vegetative communities are more amenable to achieving this goal than others. Reducing the risk of lethal fire in ecosystems that were historically nonlethal emulates how these ecosystems function, and less hazardous conditions will be easier to maintain over the long term (Brown 2000, Scott 1998). In contrast, however, it will be difficult to maintain “nonlethal” or less hazardous conditions in ecosystems like lodgepole pine that were historically lethal (Brown 2000).

Effects by Management Prescription Category

How much a particular alternative reduces the conditions that may increase the risk of wildfire in part depends on the management goals (desired outcomes) and the tools used to treat vegetation. MPC-based indicators are intended to show relative differences between the alternatives rather than to represent actual number of acres treated. For the interface areas, the desired outcome, which is a reduction in hazardous conditions, is the same for all alternatives. The relative differences between the alternatives are the tools available to alter hazardous conditions. These differences can be described in terms of MPCs that use fire versus fire/mechanical treatments for vegetation management. The fire-only MPC group includes MPCs 1.1, 1.2, 3.1, 4.1a, and 4.1b. MPCs that allow a mix of fire and mechanical treatments are 3.2, 4.1c, 4.2, 4.3, 5.1, 6.1, 5.2, and 6.2. The implied difference between these groups is the amount of area that may be treated at any one time, the rate at which the vegetative conditions may be altered, and the ability to effectively change the conditions in an area, particularly one with high stand densities (Heinlein et al. 2000, Keifer et al. 2000).

In the fire only MPC group where it occurs within interface areas, prescribed fire (as opposed to wildland fire use) would be the primary fire management tool in order to control the effect and extent. Fewer acres would be treated at any one time compared to the fire and mechanical MPCs, particularly in areas with very hazardous conditions, due to the risks associated with treating this condition. The same area may require more than one treatment over time to move toward lower hazard depending on the starting conditions. Applying treatments to the same area multiple times reduces the opportunity to treat other areas, which reduces the total amount of area that can be treated over the same time period and thus the rate at which conditions can be changed. However, as stand or landscape conditions become less hazardous, fire could be used more extensively.

In areas that provide for fire and mechanical treatments, more acres may be treated at any one time compared to fire only since the use of fire and/or mechanical can be targeted to conditions where they can be most effective. This would also reduce the number of times that the same area would require re-treatment to move toward less hazardous conditions. Therefore, where fire and mechanical treatments are available in combination, more acres may be treated and conditions changed at a faster rate than in areas where fire is the primary vegetation management tool. However, an important assumption regarding the efficacy of fire/mechanical treatments is that fuels created by the mechanical activities are treated to a point where they do not result in post-treatment hazardous conditions (Brown 2000, Fulé et al. 2001, Graham et al. 1999).

Another consideration is the amount of area in different MPCs relative to the location of the interface in the subwatershed. For example, the tools provided by an MPC adjacent to an interface area in the bottom of a drainage may produce a much different treatment effect than the same amount of an MPC around an interface area situated along a ridgeline at the top of a long slope. There are also a host of other local site conditions—such as natural fuel breaks, topography, predominant local weather patterns, etc.—that can factor in to determine the actual relationship between hazard and risk (see the *Vegetation Hazard* section, Figure VH-1).

Direct and Indirect Effects by Alternative

Issue 1 - The Role of Fire

Fire use in the alternatives is defined as fire that maintains or alters the vegetation to achieve desired conditions. Fuels treatments not intended to meet vegetation management objectives were not included in the modeling. Examples of treatments that were not represented are natural fuels treatments that do not alter the vegetative conditions, or reduction of fuels produced by mechanical activities where the mechanical treatments by themselves alter the vegetation. Fire treatments included in the modeling were fire used alone or in tandem with mechanical activities to alter the density, maintain the current vegetative condition, or replace the condition to the earliest seral stage. Fire use acres are based on only the fire portion of fire/mechanical management activities that were modeled as occurring in concert over time.

Fire Use In Forested Fire Regime Groups

Frank Church - River of No Return (FC-RONR) and Sawtooth Wildernesses - Fire use in the FC-RONR and Sawtooth Wildernesses is implemented under Wilderness and Fire Management Plans specific to those areas. Since this Forest Plan revision proposes no changes to the fire use programs in these areas, one modeling scenario reflective of the current plan desired conditions and implementation was developed to determine overall effects. All fire use was modeled as wildland fire, although both plans allow for prescribed fire where boundaries, inholdings, or other resource concerns make wildland fire use infeasible. For the FC-RONR, modeled average fire use over the first five decades was 46 percent of the forested vegetation, which is an average of about 6,000 acres per year. This reflects the amount of fire use that has been implemented over the past decade. However, the extensive wildfires that burned through the Wilderness in 2000 may reduce this level of fire use over the next five decades from what was modeled. This reduction would allow for the development of more vegetative diversity through succession, as much of the Wilderness has been affected by fire over the past few decades.

Fire use in the Sawtooth Wilderness is much lower than in the FC-RONRW due to the lower ignition potential, the smaller size of the Wilderness, and the extensive natural fuel breaks in the form of rock and water. Here, fire use over the first five decades is only 4 percent of the total forested acres, or less than 100 acres per year.

Outside of Designated Wilderness - Over the first 5 decades, Alternative 4, followed by 6, treated the most forested acres on the Boise and Payette Forests, while on the Sawtooth, Alternative 7 treated the most area with fire (Table FM-4). On all three Forests Alternative 5 treated the least. Alternative percentages fell in the same order for the Boise and Payette; the order on the Sawtooth was different than the other two Forests. Desired conditions and the hazard reduction goals in Alternatives 2 through 7 are primary drivers for determining vegetative management treatments. MPCs define the mix of mechanical-fire use that occurs. These factors, in concert with each other, determine the amount of fire that results as an outcome of the modeling for each alternative.

Total acres, however, do not represent the full picture of fire use and effects. Ecosystem processes, functions, and structures have evolved under the different fire regimes described for the Ecogroup area. The impacts of where fire is or is not used are therefore most relevant within the fire regimes, as these provide the best context for evaluating effects. Therefore, the number of acres in the historical fire regime, and the number of acres treated by alternative for each fire regime can serve to compare the effects. This is described below as a percentage of the acres treated with fire for each alternative compared to the assumed historical acres burned.

Table FM-4. Percent of the Total Forested Acres Outside of Designated Wilderness Treated with Fire Use Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	21	46	47	71	14	64	42
Payette	26	36	36	57	15	49	34
Sawtooth	4	23	19	24	5	22	26

<u>*Nonlethal Fire Regimes*</u> **-** Alternatives 4 and 6 treat the most acres with fire in the nonlethal fire regimes in the first five decades on all three Forests (Table FM-5). The order of alternatives from most to least acres treated was similar between the Forests, with some minor differences. Alternative 5 on the Payette burned the fewest acres, whereas on the Boise and Sawtooth, Alternative 1B burned the least, and Alternative 5 was second lowest. Alternatives 2 and 3 were similar and fell between the others. The arrangement appears to be related to a combination of the number of acres in MPCs that emphasize fire use for vegetation management, the hazard reduction goals, and the desired conditions. For example, Alternatives 4 and 6 generally contain more nonlethal acres in MPCs that emphasize fire use. Conversely, in Alternative 5 the highest percentage of acres in the nonlethal fire regime on all three Forests fall into MPC 5.2. Fire use is lowest in this MPC compared to the others.

Table FM-5. Percent of the Historical Forested Nonlethal Fire Regimes Treated with Fire Use Averaged Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	27	100	110	165	30	142	79
Payette	49	92	95	159	35	128	76
Sawtooth	3	145	147	171	77	169	152

Acres in the nonlethal fire regimes were treated once or twice during the first five decades. The majority of these fire treatments were designed to reduce current stand density or to maintain an existing vegetative condition, such as large trees. Because much of the Forest's uncharacteristic wildfire hazard is located in this fire regime, these areas are a focus for hazard reduction activities. The current uncharacteristic wildfire hazard for the PVGs in this group is at least moderate, or more often greater (see the *Vegetative Hazard* section, Table VH-4).

In many cases, the first fire application that alters stand density may be conducted in the spring or fall under very moist conditions, or in combination with mechanical treatments, due to excessive fuel build-ups from fire exclusion. Over time, as stand densities and fuels are reduced, burning may shift closer to the summer to better emulate the historical seasonality of fire in the Ecogroup area.

Mixed1 Fire Regimes **-** On all three Forests, the alternatives that treat the most acres in the mixed1 fire regimes are similar to that found for the nonlethal fire regimes, with a few minor differences. However, in general, fewer acres are treated. On the Boise, Alternative 4 followed by 6, would burn the most acres in the mixed1 fire regimes, and Alternative 5 would burn the fewest (Table FM-6). On the Payette and Sawtooth, Alternative 4 follows Alternative 6, although Alternative 5 again burns the least area. A combination of acres would be treated once in PVGs 3 and 6, and once or twice in PVG 5. As with the nonlethal regimes, the outcomes are related to the number of acres in MPCs that emphasize fire use to achieve the desired conditions versus those that do not. In addition, the mixed1 fire regimes contribute some uncharacteristic wildfire hazard, though not as much as the nonlethal fire regimes.

Table FM-6. Percent of the Historical Forested Mixed1 Fire Regimes Treated with Fire Use Averaged Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	7	12	9	36	0	34	10
Payette	19	23	29	43	5	49	26
Sawtooth	5	16	15	43	0	61	15

Mixed2 Fire Regimes - For the mixed2 fire regimes, alternatives that treat the most to least acres vary by Forest, though there was not as much difference between the alternatives as occurred in the nonlethal and mixed1 fire regimes. On the Boise, Alternatives 7, 1B, and 2 treat the most acres, while Alternative 5 treats the least (Table FM-7). Alternatives 3, 4 and 6 fall in between. For the Payette, Alternative 7, then 2, follows 1B. On the Sawtooth, Alternatives 7, then 2 and 4, treat the most.

Table FM-7. Percent of the Historical Forested Mixed2 Fire Regimes Treated with Fire Use Averaged Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	26	16	12	13	7	14	25
Payette	24	16	11	11	12	9	20
Sawtooth	5	16	12	16	3	15	21

In this fire regime, it appears that the outcomes from the alternatives are based on different combinations of desired conditions and/or MPCs, as this regime generates less uncharacteristic wildfire hazard than the nonlethal and mixed1 fire regimes. Alternative 5 treats the fewest acres in the mixed2 fire regime on the Boise due mainly to the MPCs. In Alternative 5, only 17 percent of the mixed2 acres fall into MPCs that emphasize fire use. Therefore, the opportunity to use fire in this fire regime is reduced in Alternative 5. Alternatives 4 and 6, which treat more acres in the nonlethal and mixed1 fire regimes than other alternatives, treat fewer acres in the mixed2 fire regimes. In the case of Alternative 4, this may be due to the desired conditions, as this alternative and Alternative 3 have the highest large tree desired conditions compared to the other alternatives. Currently the number of acres on the Forests in the large tree size, moderate canopy closure group is far below the desired level for these two alternatives. The primary way that acres move into the desired condition for two of the PVGs in this fire regime (PVGs 7 and 11) is through succession rather than from disturbance. Therefore, disturbances that alter vegetative conditions to earlier seral stages would slow the movement toward desired conditions.

Lethal Fire Regimes - For the lethal fire regimes, the alternatives that treat the most to least acres again varied by Forest (see Table FM-8). Because this fire regime generates the least uncharacteristic wildfire hazard of any, various combinations of MPCs and desired conditions determine the arrangement. On the Boise and Payette Forests, Alternative 7 followed by 2 treats the most acres. On the Sawtooth, Alternative 2 treats the most. Alternative 5 treats the fewest acres on the Boise and Sawtooth, but falls more in the middle of the alternatives on the Payette.

Table FM-8. Percent of the Historical Forested Lethal Fire Regimes Treated with Fire Use Averaged Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	11	20	14	13	6	19	23
Payette	6	6	4	9	2	11	7
Sawtooth	0	29	22	28	0	18	23

Forest-wide Implementation of Fire Use

Implementation of fire use outside of the designated wilderness areas may be influenced by fire use occurring within the wilderness and vice versa. This could occur because of overlap of resources needed to implement fire use, air quality considerations, or other factors. As most of the fire use in the designated wilderness areas occurs from wildland fire, alternatives with MPCs that emphasize wildland fire use may more often affect or be affected by implementation in the wilderness. There is no way to determine which area might take precedence over the other because wildland fire use is initiated via an unpredictable ignition source (lightning). Conversely, alternatives with MPCs that emphasize prescribed fire may be less affected because there may not be as much overlap between the prescribed fire and wildland fire use seasons.

Fire Use in Non-forested Fire Regime Groups

As with the forested vegetation, non-forested acres treated by various vegetation management tools, including fire, reflect the mix of activities and treatment rates allowed by the MPCs applied to meet the theme for each alternative (see Appendix B). Unlike the modeling done for the forested vegetation, achievement of desired conditions was not used as a modeling objective for the non-forested vegetation. This was due to a difference in the model used for non-forested versus forested vegetation. For the non-forested vegetation, the primary driver for the modeling was the MPCs, which represent different treatment rates.

Over the first 5 decades, Alternative 5, which emphasizes production of commodities including livestock forage, treated the most non-forested acres on the Boise and Sawtooth with fire (Table FM-9). Alternatives 3 and 1B followed 5 on the Boise. On the Sawtooth, Alternative 5 burned the most acres, and 1B was second. Though Alternative 1B contains a mix of MPCs that allow for the amount of treatment displayed in Table FM-10, currently very little treatment is being implemented on either Forest. Alternative 6, then 4, which are both oriented toward more wildland fire use, treated the fewest acres on both Forests.

Table FM-9. Percent of the Total Non-forested Acres Treated with Fire Use During the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	105	103	107	84	113	83	99
Sawtooth	99	93	93	80	103	70	92

The amounts by alternative represent acres treated once, or in some cases twice, over the five decades; they do not indicate that all acres were treated during this time period. This is evidenced by the number of acres that move into the high or very high canopy cover class, which can only by achieved in the model through succession without disturbance. Depending on the alternative, between 9 to 15 percent of the conditions represented by acres at the fifth decade result from succession (Table FM-10). As would be expected, the arrangement of the alternatives based on the percent of total acres that result from succession is almost inversely related to the arrangement based on fire use. That is, the alternatives with the most fire use over the first five decades have the fewest acres in the high or very high canopy cover class, and vice-versa, for both Forests.

Table FM-10. Percent of the Total Non-forested Acres in High or Very High Canopy Cover Class at the Fifth Decade, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	11	12	10	15	9	17	11
Sawtooth	15	15	14	17	13	21	14

Mixed1 Fire Regimes - Wyoming big sagebrush is the only community that makes up the mixed1 fire regime. Of the three dominant sages that occur on the Sawtooth, Wyoming grows on the most xeric sites. Historically, these areas produced less fuel due to these dry conditions (Winward 1985). Fires were infrequent and created small patches of mortality where fuels were more concentrated and continuous. Currently, much of the area where Wyoming sage occurs has been invaded by cheatgrass. This annual grass produces a fine, continuous litter that burns readily (Humphrey and Schupp 2001). Fires in areas dominated by cheatgrass are often

extensive and can occur annually. Because fire, particularly higher severity fire, can increase the spread of cheatgrass, prescribed fire was the only fire disturbance represented for this type, because more control can be exerted over burn location and timing. Wright et al. (1979) reported that cheatgrass can be suppressed by burning early in the summer.

Alternative 6 treats the least amount of area in the mixed1 fire regimes with fire over the first five decades (Table FM-11). Alternative 7, followed closely by Alternatives 3 and 4, treat the most. Alternative 6 treated the least amount of acres because it has the least amount of area in MPCs that use prescribed fire. This is conversely why Alternatives 7, 3, and 4 treat the most area. In these cases, most of the Wyoming big sagebrush occurs in MPCs that emphasize restoring conditions using prescribed fire, although the modeled rates of prescribed fire are considerably less than other sagebrush types in order to allow this type to develop toward the higher canopy cover desired conditions.

Table FM-11. Percent of the Historical Non-forested Mixed1 Fire Regime Treated with Fire Use Averaged Over the First 5 Decades, by Alternative on the Sawtooth Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Sawtooth	24	30	44	43	24	5	45

Mixed2 Fire Regimes – In the mixed2 fire regimes, Alternative 6, followed by 4, treats the fewest acres on both Forests, while Alternative 5 treats the most (Table FM-12). On the Boise, Alternatives 1B, 2, and 3 treat similar amounts of area; on the Sawtooth these alternatives were the same. However, though the amount of area treated was similar for these three alternatives, acres treated in Alternatives 2 and 3 were through a combination of prescribed fire and wildland fire use, while in Alternative 1B all treatments were with prescribed fire.

Table FM-12. Percent of the Historical Non-forested Mixed2 Fire Regimes Treated with Fire Use Averaged Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	42	41	43	34	45	33	39
Sawtooth	42	42	42	36	47	31	41

Overall, as with the mixed1 fire regimes, the outcomes of the alternatives appear to be related to acres in MPCs that emphasize prescribed fire, though wildland fire use is considered a viable management option in this fire regime. For Alternative 5, all but a very small number of acres are in MPCs that provide for prescribed fire, while Alternatives 6 and 4 have the fewest. In these two alternatives, half or more of the treatment acres are from MPCs that emphasize wildland fire use.

Lethal Fire Regimes – All alternatives treat the most acres relative to historical in the lethal fire regimes (Table FM-13). Here, Alternative 2, followed by 7, treats the most area, and Alternatives 1B and 5 treat the least. In this fire regime, the arrangement is related to various combinations of prescribed fire and wildland fire use. Alternative 1B does not provide for wildland fire use; this alternative treats the fewest acres. Also, Alternative 5 has only a small amount of area in MPCs that allow for wildland fire use. Conversely, Alternatives 2 and 7 have acres in MPCs that provide for a combination of these two fire treatments.

Table FM-13. Percent of the Historical Non-forested Lethal Fire Regimes Treated with Fire Use Averaged Over the First 5 Decades, by Alternative and by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Sawtooth	45	66	57	52	48	49	61

Issue 2 - Wildland-Urban Interface

Interface Subwatersheds with High and Extreme Hazard Indexes

Vegetation management objectives in interface subwatersheds vary depending on the historical fire regimes. In interface subwatersheds with high or extreme uncharacteristic wildfire hazard indexes, treatments that reduce the current hazard toward conditions that are more in concert with the historical nonlethal or mixed1 fire regime should increase the likelihood of suppressing fire starts. In areas with historically mixed2 or lethal fires, vegetative manipulations that produce vegetative mosaics, fuel breaks, or other less lethal conditions in key locations can provide defensible areas from which to suppress wildfires (Quigley and Arbelbide, 1997, Vol. II). Fires that start in areas with hazardous vegetative conditions often move into the crowns, making them more difficult to suppress. Altering the vegetation to less hazardous conditions where fires burn as underburns rather than crown fire increases the chances that a fire will be quickly suppressed while small, or will be easier to control in certain areas (Deeming 1990, Finney 2001).

Alternative 5 on all three Forests would provide the greatest opportunity to alter hazardous vegetative conditions in interface subwatersheds in the short term, and to maintain them in the long term, because all interface subwatershed areas are in MPCs that allow fire and mechanical to treat vegetation (Table FM-14).

Table FM-14. Percent Of Total Interface Subwatershed Area in MPCs that Allow Fire Only Versus Fire/Mechanical Vegetation Management, by Alternative

Forest	Treatments Allowed	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	Fire Only	11	12	2	29	0	63	1
	Fire/Mechanical Mix	89	88	98	71	100	37	99
Payette	Fire Only	39	40	11	68	0	62	22
	Fire/Mechanical Mix	61	60	89	32	100	38	78
Sawtooth	Fire Only	27	26	11	75	0	80	18
	Fire/Mechanical Mix	73	74	89	25	100	20	82
Total for Ecogroup	Fire Only	21	21	7	52	0	69	11
	Fire/Mechanical Mix	79	79	93	48	100	31	89

The majority of interface subwatershed area in Alternatives 3 and 7, followed by 1B and 2, are also in MPCs that use both tools. Alternatives 4 and 6 have the least amount of area in MPCs that provide fire and mechanical tools. In these alternatives the majority of interface subwatershed area occurs in MPCs where fire is the only management tool. In this case, more time would be required to alter vegetative conditions, and therefore the short-term risks of wildfire would remain high. Over the long term, hazard may be reduced in areas where fire is a viable vegetation management tool, given appropriate conditions. However, in some areas, conditions, particularly where the hazard is very high, may be such that fire alone would not be a viable management option. In these areas, wildfire hazard would continue to increase.

Interface Subwatersheds with Low and Moderate Hazard Indexes

The management objective in interface subwatersheds with low or moderate hazard indexes where vegetation was historically nonlethal or mixed1 could be to treat vegetation to maintain the current low hazard consistent with the desired conditions for the alternative (See the *Vegetation Hazard* section). In this case, fire only or fire and mechanical treatments may provide similar opportunities to maintain conditions in the short and long term. Most subwatersheds with low or moderate uncharacteristic wildfire hazard indexes also have a predominance of historically mixed2 and lethal fire regime areas. Though vegetative conditions in these subwatersheds are still within the historical range, in some cases the extent and pattern on the landscape creates larger areas of lethal fire than occurred in the past, increasing resistance-to-control. Even in these fire regimes, some vegetative conditions experienced underburns. One management objective in historically mixed2 and lethal subwatersheds could be to reduce the homogeneity and extent of areas that would burn lethally on the landscape, providing strategic places where fires could either be suppressed, or where effects to adjacent private or state ownerships would be acceptable. In this case, MPCs that provide for a mix of fire and mechanical can likely accomplish this objective faster than where fire only is the primary tool. In addition, fire use in mixed2 and lethal fire regimes adjacent to other land ownerships may be unpalatable because of the perceived risk.

Effects of Desired Conditions on Hazard

Though MPCs indicate opportunities to reduce hazardous conditions, in some cases the desired conditions themselves may contribute to vegetative hazard. Desired conditions define the vegetative stages that occur on the landscape and subsequently the level of hazard. The *Vegetative Hazard* section of this chapter describes the relationship between desired conditions, and the Forest-wide uncharacteristic wildfire hazard. Desired conditions also determine the hazard associated with resistance-to-control which is generally assumed to increase with increasing density.

The potential effects of the desired conditions, and the hazard this might carry in the wildland-urban interface, vary for each interface area and alternative. Though the intent is to meet National Fire Plan goals under all alternatives, the juxtaposition of the interface relative to areas that may have more hazardous desired conditions is highly variable. For uncharacteristic wildfire hazard, alternatives that move more area into the historical range of variability—particularly toward large tree, low canopy closure—are less hazardous. Forest-wide, the desired conditions for Alternatives 3 and 4 produce the lowest uncharacteristic wildfire hazard, as the desired condition for all areas in these alternatives is within HRV (see Table VH-11 in *Vegetation Hazard*). In these cases, desired conditions Forest-wide decrease the risk of uncharacteristic wildfire, which includes interface areas. Alternative 5, followed by 1B, produces the most hazardous Forest-wide desired conditions due to the amount of area in MPC 5.2. For the PVGs that contribute the most to uncharacteristic wildfire hazard (for example PVGs1, 2, and 5), desired conditions for MPC 5.2 are outside of HRV. In the case of these alternatives, the juxtaposition and distribution of these areas relative to interface across the landscape determines the risks. On the Boise, more than half the interface subwatershed area in Alternatives 5 and 1B is assigned to MPC 5.2 (Table FM-15). On the Payette for Alternative 5, the majority of the interface subwatershed area is assigned to MPC 5.2. The ranking of the alternatives from most interface subwatershed area assigned to MPC 5.2 is the same as the ranking of area assigned overall (see *Vegetation Hazard*, Table VH-10). In descending order, Alternatives 1B, 7, 2, and 6 on the Boise and Payette provide less area with desired conditions outside of HRV. As the amount of area in HRV increases, the risk of uncharacteristic wildfires moving across the landscape decreases.

Table FM-15. Percentage of Total Interface Subwatershed Area Assigned to MPC 5.2, by Alternative by Forest

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	54	17	0	0	59	9	31
Payette	27	11	0	0	76	9	14
Sawtooth	2	0	0	0	21	0	0

Even though the desired conditions within the MPC 5.2 areas for some PVGs is more hazardous than in other MPCs, wildfire risk can be mitigated in these areas using a variety of approaches. Fuel breaks, strategic placement of less hazardous conditions relative to more hazardous, the location of conditions in relation to the topography and typical fire movement patterns, all factor into determining risk (see the Resource Protection Methods discussion in this section and in *Vegetation Hazard*). In addition, there are opportunities within the MPC 5.2 desired condition range for the more hazardous PVGs to reduce hazardous conditions. This can be accomplished by providing more area at the higher end of both the large tree size class and low canopy closure range. This condition is closest to the historical range of variability for those PVGs that contribute the most to hazard. Therefore, these conditions reduce the risk of uncharacteristic wildfire the most within the MPC 5.2 desired condition range. For resistance-to-control, treatments that move vegetation toward the higher end of the least dense canopy closure desired conditions reduce the risk of wildfires that resist control.

Cumulative Effects

Issue 1 - The Role of Fire

Other ownerships adjacent to or surrounded by lands administered by the Forest Service affect opportunities to use fire, and therefore to emulate historical fire effects, particularly over landscapes. In general, private landowners use timber harvest rather than fire to manage their vegetation. Fire may be used to treat activity fuels, but treatments are often limited in extent and effect. The proximity or inclusion of private lands affects in particular the use of wildland fire for resource benefits, because these fires can burn over large areas for long time periods depending on the vegetation, fuels, weather, and other factors. However, wildland fire use or prescribed fire could be coordinated with adjacent federal landowners such as the BLM. In this case, effects could extend beyond lands administered by the Forest Service.

Issue 2 - Wildland-Urban Interface

Wildland-urban interface includes subwatersheds in which private lands are wholly surrounded by lands administered by the Ecogroup Forests, and subwatersheds in which private lands adjoin the Ecogroup Forests as well as other ownerships (other private, state, or federal). In cases where private lands are surrounded by lands administered by the Ecogroup Forests, vegetative conditions and treatments to reduce hazard may be more strategically placed at a landscape scale. However, the risk to structures located in the interface also depends on the conditions found on those lands, including vegetation, where the structure is located relative to defensible space, the type of building materials, and other mitigations. The intent of the National Fire Plan is to develop strategies and treatments that are coordinated between various landowners, including federal agencies, to address the variety of hazards and risks that occur to reduce undesirable wildfire effects on all lands. This coordination would extend the effects of treatments beyond lands administered by the Forest Service. Ultimately however, structure protection on private property is the responsibility of the property owner.

Rangeland Resources

INTRODUCTION

Rangelands are defined as "…*those areas of the world, which by reason of physical limitations low and erratic precipitation, rough topography, poor drainage, or cold temperatures are unsuited for cultivation and which are a source of forage for free ranging native and domestic animals, as well as a source of wood products, water and wildlife*". This definition includes grasslands, shrublands, and forest areas often used by grazing animals (Stoddart et al. 1955). Rangeland capability, as defined by the Forest Service, represents the physical attributes or characteristics of the landscape that are conducive to livestock grazing. Suitability is defined as those capable National Forest System lands that are allocated to grazing use based on decisions related to social, economic, or environmental choices and uses foregone. These definitions vary from those traditionally used by the Forest Service in managing rangeland resources, due to recent changes in regulations. In past planning activities, capability was usually combined with the term suitability.

The capability determination is made at the programmatic or Forest Plan level only. This determination is not a decision to graze livestock on any specific area of land, nor is it a decision on livestock grazing capacity. Its purpose is to establish a foundation for alternative development and evaluation. Capable acreage remains the same for all alternatives. This determination is not a Forest Plan decision that requires alternative development and public comment.

Suitability determinations are best made at the Forest Plan level. Suitability is established either to provide prescriptive management direction for project-level analysis and subsequent NEPA decisions, or as a decision to not graze specific designated areas. Once capability is determined, livestock grazing is assessed on an area-by-area basis and by alternative in the Forest Plan EIS. Suitable acres may vary by alternative. Typically, the areas reviewed in this assessment are by watersheds or portions of watersheds. The purpose of using this scale is to see if livestock grazing is compatible with management area emphasis, uses, and values identified in the alternative. Suitability also looks at what uses are foregone with livestock grazing. Historical records, site-specific information, and public comments may be sources for providing rationale. Suitability determinations require public comment.

New information and research related to physical and biological impacts of livestock grazing on riparian and aquatic ecosystems have occurred since the approval of the existing Forest Plans. Also, the current scientific understanding embodied in the Interior Columbia River Basin (ICRB) Assessment and interim strategies for managing watersheds producing anadromous fish (Pacfish) and inland fish (Infish) has precipitated a more critical look at grazing use standards. Implementation of new direction from Pacfish and Infish, as well as standards and modifications associated with new science, has affected the way or method in which livestock grazing has been conducted on the three Ecogroup Forests. However, original analyses associated with these decisions stated that implementation of direction would not result in significant changes in livestock stocking or use levels.

Also, when the plans were originally developed, it was assumed that range management, improvement, and development budgets would remain constant. These budgets were expected to maintain intensive range management programs and existing livestock stocking levels. However, range program budgets have not been sustained at the levels assumed. Furthermore, meeting the requirements of Pacfish and Infish decisions have increased management costs for portions of the Forests, and for grazing permittees associated with those areas.

Issue and Indicators

Issue Statement – Forest Plan management strategies may affect rangeland resources, including lands considered suitable for livestock grazing and the form of livestock grazing management authorized under permit for the Forests.

Background to Issue – A Need For Change related to rangeland resources was identified in the *Preliminary AMS for the Southwest Idaho Ecogroup* (USDA Forest Service 1997) and is summarized here. There is a need to modify current management direction for livestock use of riparian areas to reflect current research and Forest observations. New information regarding the proper functioning condition of rangelands, the identification of areas susceptible to soil erosion, and the risks of livestock/ wildlife disease transmission need to be considered in management direction. The interaction between recreation and livestock needs to be considered, given the large increases in recreational activity. Given that grazing use on the three Forests has been significantly less than prescribed, and increases in administration, monitoring, and permittee operational costs have occurred, direction needs to be modified, since these changes indirectly affect the levels of outputs projected by the Forest Plans. To address Need For Change, modifications in Forest Plan direction have been proposed for rangeland resources, and the effects of those modifications are analyzed in this section.

In addition to the Need For Change described above, issues were considered from responses to public scoping conducted for this EIS. Several comments expressed concern about how revised Forest Plan direction will affect livestock operations and livelihoods. They felt that further restrictions on allotments already financially overburdened, due to high maintenance and operation costs, would have significant financial and social effects. There is a fear that inappropriate or arbitrary broad-scale restrictions and determinations made at the Forest Plan level (capability and suitability) will limit ground level or allotment management flexibility. Another perception was the lack of emphasis on livestock grazing in relation to other resource uses. There is a concern that with the assignment of management prescription categories emphasizing recreation, wildlife, and timber, livestock grazing would be de-emphasized and become a low priority. Capability, suitability, management flexibility, and prescriptions are all addressed by the analysis in this section. The potential social and economic effects of rangeland management options are discussed in the *Socio-economic Environment* section of this chapter.

Other comments were concerned about the effects of permitted livestock grazing on Forest Service system lands and other resources. Most concern revolved around riparian area livestock use and its effect on fisheries, biodiversity, and water quality. One person said that riparian management direction needed to be consistent across all three Forests to prevent a “mish mash” of different levels of management. Although this analysis discusses general effects from livestock grazing on other resources, those effects are analyzed in more detail within the appropriate resource sections of this chapter.

While several internal Forest Service comments referred to the need to conduct rangeland capability and suitability analyses, the viewpoint of a few was that Forest Plan direction needs to establish and display programmatic capability criteria for use by the districts in determining grazing capacities. Others believed that allotment grazing capacity determinations need to be based upon site-specific information related to condition of the rangelands, the quality of management being applied, and the grazing management approach.

Indicators - The following indicators will be used to measure the effects on rangeland resources for the three Forests by alternative:

1. *Estimated suitable rangeland acres by Forest* - This indicator reflects the suitability determinations by alternative, which is a requirement by regulation.

2. *Estimated suitable rangeland acreage that occurs within More Restrictive and Less Restrictive Management Prescription Categories* – The assignment of suitable rangelands to certain management prescriptions will affect the response, and influence the rate of recovery for rangelands, and will indirectly display potential effects on grazing permittee operations and community economies. The term "rangelands" refers to lands grazed by domestic livestock, and not the "non-forested vegetation" that is addressed in the *Vegetation Diversity* section of this EIS.

Affected Area

The affected area for direct and indirect effects for rangeland resources are lands administered by the three National Forests in the Ecogroup within existing allotments. Some management areas may be highlighted in discussions, due to the significance of their contributions to Forest-wide effects. These affected areas represent lands where rangeland resources could exist, and the lands where those resources could receive impacts from management activities, environmental conditions, and natural events.

The affected area for cumulative effects includes lands administered by the three National Forests, and the communities that are dependent upon livestock forage outputs from National Forest System lands. Some discussions about communities may be more detailed, depending upon the significance of their contributions or effects by alternative (see *Socio-economic Environment* section in this chapter). This expanded area is necessary to show the relationship between Forest actions and their effect on local economies.

CURRENT CONDITIONS

Rangeland Capability

The Boise, Payette, and Sawtooth National Forests contain about 6,600,000 acres of National Forest System lands. An estimated 18 percent of those lands are capable for grazing. Table RR-1 displays the acres of capable rangeland by Forest. Shoshone Creek (SNF), Rock Creek (SNF), Trapper/Goose Creek (SNF), Snake River (PNF), Weiser River (PNF), Lower South Fork Boise River (BNF), and Mores Creek (BNF) Management Areas contain the greatest percentage of capable rangelands for their respective Forests (Rangeland Technical Report #3). An estimated 359,752 acres of the capable rangeland (31 percent) occurs within Land Capability Groups 6-9 within the Ecogroup area. Land Capability Groups are defined and mapped in Appendix G to the revised Forest Plans. The Boise National Forest has the most (223,104 acres) within Land Capability Groups 6-9, while the Payette National Forest has the least (43,145 acres). All lands, regardless of slope, are capable and suitable for grazing and browsing by wildlife.

Table RR-1. Capable Rangeland by Forest

Forest	Total Forest System Acres	Areas Outside Allotments[+]	Acres of Capable Rangeland*	Percent Considered Capable	Percent of Capable Rangeland in Land Capability Groups 6-9
Boise	2,202,490	426,480	398,400	18	56
Payette	2,299,290	1,322,740	227,080	10	19
Sawtooth	2,110,950	368,230	535,010	25	39
Ecogroup Totals	**6,612,730**	**2,117,450**	**1,160,490**	**18**	**31**

[+] Not all National Forest System lands have received an allotment designation. This category includes lands without an allotment designation or where allotments have been officially closed.
*Capable rangeland acres within vacant or open allotments.

The Forest Service conducts area or allotment assessment on an ongoing basis to determine the status of rangeland conditions. Table RR-2 and RR-3 display the current status of conditions and trends by Forest. Also, the *Vegetation Diversity* section in this chapter displays Properly Functioning Condition status of certain vegetation cover types used as rangelands.

Table RR-2. Status of Range Vegetation in Allotments[#]

Forest	Percent of Allotment Range Vegetation Meeting Current Forest Plan Objectives	Percent of Allotment Range Vegetation Moving Towards Current Forest Plan Objectives	Percent of Allotment Range Vegetation Not Meeting Forest Plan Objectives
Boise	46	36	18
Payette	62	33	5
Sawtooth	72	20	8

[#] This includes both upland and riparian vegetation

Table RR-3. Status of Riparian Vegetation in Allotments

Forest	Percent of Allotment Riparian Vegetation Meeting Current Forest Plan Objectives	Percent of Allotment Riparian Vegetation Moving Towards Current Forest Plan Objectives	Percent of Allotment Riparian Vegetation Not Meeting Forest Plan Objectives
Boise	43	45	12
Payette	58	36	6
Sawtooth	56	31	13

Factors Affecting Rangeland Management and Suitability

Riparian Conservation Areas

Establishment of Riparian Conservation Areas (RCAs)—or Riparian Habitat Conservation Areas (RHCAs) in Alternative 1B—and their associated riparian management objectives have influenced grazing activities on all three Forests. An estimated 16.6 percent of the lands within the Ecogroup grazing allotments have been designated as being within RCAs/RHCAs (Table RR-4). Current research and management experience on the Forests shows that previous plans' grazing standards for forage use are inconsistent with riparian management objectives (RMOs) established for RHCAs, or riparian management direction established for RCAs. Studies indicate that stream bank compaction and trampling by cattle affects many stream systems more than forage use. Preventing damage to anadromous fish redds is also a concern. Consequently, some standards specifying something other than current utilization levels may be more appropriate in riparian management direction (see Forest-wide direction for Soil, Water, Riparian, and Aquatic Resources in the revised Forest Plans). Most of these types of management adjustments have developed as part of the Annual Operating Instructions and Allotment Management Plans. All three Forests have conducted and continue to participate in consultation with NMFS and U.S. Fish and Wildlife Service about the management of allotments in watersheds with threatened and endangered fish species. Some of the management adjustments have resulted in changes to annual grazing season and numbers of livestock.

Table RR-4. RCAs/RHCAs Within Allotments

Forest	Acres of RCA/RHCAs within Allotments	Acres Outside RCA/RHCAs within Allotments	Percent of Allotment Lands Contained within RCA/RHCAs	Riparian Areas within Allotments	Percent of Allotment with Riparian Veg. Cover Types
Boise	399,898	1,797,667	18.2	64,272	2.9
Sawtooth	281,743	1,504,506	15.8	16,392	0.9
Payette	160,450	914,155	14.9	41,527	3.8
Ecogroup Totals	**842,091**	**4,216,328**	**16.6**	**122,191**	**2.4**

Current Livestock Levels

Livestock grazing is permitted during the summer months. The normal grazing season is May through the first of October. Currently, an estimated 42,088 cattle and 101,896 sheep are permitted to graze between the three Forests. Authorized use has ranged from 363,116 to 543,742 head months over the last three years (Table RR-5). These numbers reflect annual operating plan changes and variability as a result of compliance with the Endangered Species Act, post-wildfire resource condition recovery, drought management, and voluntary non-use.

Table RR-5. Range of Recent Authorized Livestock Head Months/Yr

Forest	Head Months (Sheep)	Head Months (Cattle)
Boise	65,978 - 128,483	32,727 - 38,927
Payette	35,510 - 56,954	34,709 - 38,883
Sawtooth	116,841 - 181,432	77,351 - 99,063
Ecogroup Totals	**218,329 – 366,869**	**144,787 – 176,873**

Vacant Allotments

There are eight vacant allotments containing 45,077 acres capable of supporting livestock. Most of these allotments have been vacant since the 1980s. An analysis was conducted to determine which of these allotment or portions of the allotments have value from a livestock grazing standpoint and should be retained, and which ones have little to no value and should be closed. See Technical Report No. 3 for information related to the analysis of the allotments. Table RR-6 displays a summary of the vacant allotments considered in determining rangeland suitability.

Table RR-6. Existing Vacant Allotments

Allotment Name	Adjacent to Active Allotments	Livestock Type Best Suited for Use	Other Resource Considerations
Anderson Creek	Yes	Sheep	Yes
Bull Trout	Yes	Sheep	Yes
Deadwood East	Yes	Sheep	Yes
Eight Mile	No	Sheep	Yes
Five Mile	No	Sheep	Yes
Fir Creek	Yes	Sheep	Yes
Sheep Creek	Yes	Sheep	Yes
Whitehawk	Yes	Sheep	Yes

Demand Versus Use - The extent to which the overall demand for livestock forage is being met has not been determined. However, actual average livestock use levels (Head Months per year) are lower than originally anticipated in the original Forest Plans. Some probable contributing factors to this trend are:

- Protection of threatened and endangered species habitat.
- Limited agency funding to implement capital improvements and range developments.
- Voluntary and involuntary reductions for resource protection.
- Permit waivers back to the government that were not re-issued, due to resource concerns.
- Livestock markets and ranch economies reactions to changes in demand and competition.
- Recovery efforts for large wildfire areas that included temporarily reduced grazing use.

Budget Allocations
The Forest Plans for the three Forests anticipated that annual range budget allocations would be similar to those listed in Table RR-7. Actual allocations were only 42 to 68 percent of those anticipated (USDA Forest Service 1997).

Table RR-7. Anticipated Budgets and Actual Allocations

Forest	Anticipated Allocation	Actual Allocation	Percent Funded
Boise	$654,000	$272,000	42
Payette	$445,000	$302,000	68
Sawtooth	$736,000	$410,000	56

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods
Resource protection has been integrated into rangeland management direction at various scales, from national to site-specific. The cumulative positive effect of the multi-dimensional direction described below is beneficial protection and mitigation for all resources that may potentially be adversely affected by livestock grazing activities.

Laws, Regulations, and Policies – Numerous laws, regulations, and policies govern the use and administration of rangeland resources on National Forest administered lands. Some of the more important ones are described in Appendix H, Legal and Administrative Framework. National laws and regulations have also been interpreted for implementation in Forest Service Manuals, Handbooks, and Regional Guides. All grazing activities authorized under permit must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation of grazing practices, and for protection of rangeland-related resources.

Forest Plan Direction – Although Forest Plan management direction for rangeland resources would vary somewhat by alternative, direction for all alternatives has been developed to maintain or improve rangeland conditions on National Forest administered lands. Direction occurs at both the Forest-wide and Management Area levels. Rangeland resource goals and objectives have been designed to achieve desired rangeland conditions over the long term, and to maintain or restore sustainable levels of forage production, livestock use, and ecosystem functions and processes. Rangeland standards and guidelines have been designed to protect upland and riparian vegetation, as well as other resources that could be adversely affected by livestock grazing activities. Furthermore, management direction for other resource programs—such as vegetation, soil, water, riparian, aquatic, wildlife, and recreation—provide additional guidance and resource protection in an integrated manner.

Forest Plan Implementation - Proper livestock grazing generally depends on current and site-specific information about biophysical conditions, livestock numbers, season of use, timing and duration of use, livestock management practices, range development and improvement levels, permittee capability, etcetera. These factors are not easily addressed at the programmatic level, or may be similar to all alternatives. The allotment management planning and term grazing permit administration process, however, can and will address all of these factors at the project area or allotment scale. Through this process, which is the same for all alternatives, adjustments in livestock use and management practices would be made to address resource concerns in a timely, effective, and site-specific manner that involves the Forest Service, permittees, and the public in land management actions.

Currently, 59 percent of the allotment rangelands within the Ecogroup area are meeting original Forest Plan objectives, and 29 percent are moving towards those objectives. These objectives include requirements due to Pacfish and Infish. (See the *Vegetation Diversity* section and Technical Report for a discussion on the ecological status of shrubland, grassland, and riparian cover types.) In areas where present rangeland conditions are not meeting previous Forest Plan objectives, conditions are expected to improve under all alternatives with the implementation of Forest Plan management direction. However, the rate of improvement and approach to management may vary by alternative. (Note: The original Forest Plan objectives for range management are NOT the same as the revised Forest Plan objectives and desired conditions for non-forested vegetation.)

Grazing Permits and Administration

Livestock use and its associated activities will be allowed under the Term Grazing Permit system, within all the MPCs described in Chapter Two, Features Common to all Alternatives, except in MPC 2.2. The authority to protect, manage, and administer National Forest System lands for range management will be in accordance to the terms and conditions specified in Parts 1 through 3 of the term grazing permit issued for a specified area. Grazing administration responsibilities will not vary by alternative selection, as they are determined by existing policy (*FS Manual 2230, Term Grazing Permit Administration*) and annual budget priorities.

Capable Rangelands

Capable rangelands are accessible to livestock, produce forage or have inherent forage-producing capabilities, and can be grazed on a sustained yield basis, under typical and reasonable management practices. They can include forested lands, which, after timber harvest or fire, have become accessible and can produce forage. These lands are called transitory range. Forage may be produced for 10 or more years before changes terminate available production or accessibility.

Rangelands may contain areas that should not be considered part of the grazing base because of site accessibility (availability), low productivity, or soil erosion susceptibility. These areas are deducted from the total acreage within all Forest allotments in order to determine rangeland capability. See Table RR-1 for capable rangelands by Forest.

Suitable Rangelands

The three Forests have been analyzed for being suitable to grazing and browsing as required in 36 CFR 219.20. This analysis considered other uses or values of the area. All lands, with the exception of talus slopes, water and rock, are suitable for grazing and browsing by wildlife. Suitable range used by wildlife will remain the same for all alternatives. The availability of forage in localized areas for wildlife (e.g., elk, mule and whitetail deer, bighorn sheep) may vary by alternative, due to some suitability changes. However, no deductions to livestock suitability were made or based on livestock-wildlife ungulate competition for forage, as this was not identified as an issue in any specific location. The analysis does identify areas where grazing under a term permit is not appropriate. Some lands within the Forests are incompatible with domestic livestock grazing or do not allow grazing due to alternative uses foregone (see also Direct Effects). A few situations apply to all forest plan revision alternatives. Research Natural Areas (RNAs) are not included as part of the alternatives' suitable rangelands. This deduction occurs so as to prevent livestock grazing from adversely affecting the vegetation values that the RNAs were established to preserve, and to help maintain these areas for future scientific research. Some of the RNAs have pre-existing decisions prohibiting grazing within their boundaries, or are in areas inaccessible, undesirable, or unsuitable to livestock. There are no proposed changes in permitted livestock numbers as a result of preventing the use of RNAs. Also, existing administrative sites and developed recreation sites are deducted, due to the incompatibility of uses. Livestock head months will not be affected by this deduction.

General Effects from Livestock Grazing

Grazing animals affect plant and aquatic communities in several interrelated ways, including: plant defoliation, nutrient redistribution, and mechanical impact to soil and plant material through trampling. These activities may affect or influence different components of the Ecogroup's Ecosystem Management framework (see Chapter 3, *Introduction*, for explanation of components) in positive, neutral, or negative ways. The affects to ecosystem components can be classified as either direct or indirect:

Direct Effects - Grazing and associated activities can directly alter, positively or negatively, the amount of vegetation present at different times of the year (biological); the degree of soil compaction (physical); the amount of ground cover (physical); ungulate forage availability (biological); the effectiveness of terrestrial habitat (biological); the level of reproductive success for some aquatic species (biological); and the annual operation costs and income of individual livestock operations (economic). These are general effects common annually which contribute to short-term indirect and cumulative effects.

Indirect Effects - Grazing and associated activities can indirectly alter the composition of herbaceous and shrub vegetation; the degree of shrub canopy closure; vegetative age class patterns; plant productivity; individual plant vigor (biological); surface soil erosion rates; water quality; soil productivity (physical); aquatic and terrestrial habitat effectiveness (biological); fire regimes (physical), susceptibility to exotic plant invasion, shrub and tree regeneration (biological), forage production, individual and community income (economic), community stability, diversity, demographics, and resiliency (social). These indirect effects become more apparent in the latter portions of the short-term period. Most of these effects become more apparent after 10 to 15 years (long-term) and tend to contribute to cumulative effects.

Grazing Factors Affecting Plant Physiology and Succession - Most of the potentially affected elements described above are reliant on or tied to the health of the vegetative community. In most cases, biological and physical elements will respond in a similar manner as what is occurring to plants physiologically and successionally. Therefore, plant physiology, ecology, and response to grazing are key aspects to determining the effects of grazing on rangeland vegetation and forage production.

There are three generally accepted grazing principles that affect plant physiology and succession. They are grazing frequency, intensity, and opportunity. Frequency is generally related to the number of times forage plants are defoliated during a grazing period. It is dependent on the length of time plants are exposed to grazing animals. Intensity is related to the amount of leaf material removed during the grazing period, which influences the plant's ability to recover from grazing during the same growing season. Opportunity is related to the amount of time plants have to grow prior to grazing or to regrow once grazing has occurred. The plant must be able to fully store energy at some time during the active growth period in order to maintain plant vigor.

All three principles will influence and affect plant vigor and reproductive health. They will also have corresponding or parallel influences on other biological and physical elements. A more detailed discussion about the effects of these three influences is contained in the Rangeland Resources Technical Report #3 in the project planning record, and in the Direct and Indirect Effects discussion below.

Effects by Management Prescription Category - The Management Prescription Categories (MPCs) described in Chapter 2 have been divided into two groups, based upon their emphasis on the three grazing principles described above.

- *MPCs Where Livestock Grazing Management is More Restrictive* (MPCs 1.1, 1.2, 2.1, 2.4, 3.1, 3.2, 4.3) - The areas where these prescriptions are applied tend to have more restrictive or constraining direction at the Management Area level, and could be more restrictive than the Forest-wide standards and guidelines. Grazing *frequency* and *opportunity* may be part of management direction but are not emphasized to same the degree as *intensity.* Direction usually places more emphasis on controlling grazing *intensity*, typically through the use of standards and guidelines for utilization, stubble heights, streambank stabilization or disturbance requirements, seasonal restrictions of use, the establishment of conservative stocking rates, etc. This direction may translate into shorter grazing periods or seasons for livestock grazing, and/or lower livestock numbers, and more management by livestock operators. As result, forage outputs could potentially be less and livestock operator costs could be higher if specific management options conflict with the emphasis or direction of the MPC. These restrictions could indirectly affect the management or use of private lands surrounding the Forest. This assumption is based upon the likelihood that livestock will have to leave the Forest early, due to restrictive standards, and return to the permittee's property or leased private lands earlier than planned. An early return would increase forage demand for a longer duration, thus causing potential management adjustments or detrimental resource effects to the private or leased lands (Knize 1999). The areas where these prescriptions are applied may also have specific management requirements; such as pasture occupation may be restricted at certain times of the year (e.g., for protection of redds from livestock trampling). These requirements would be based on site-specific desired conditions, goals, and objectives for a watershed or Forest Plan Management Area. In these situations, the use of grazing *opportunity* may be limited. Generally, riparian resource improvement would occur at a higher rate in these areas, particularly in areas of past grazing-related impacts.

- *MPCs Where Livestock Grazing Management is Less Restrictive* (MPCs 4.1, 4.2, 5.1, 5.2, 6.1, 6.2) - Using a combination of several best management practices in conjunction with Forest-wide standards, a more flexible approach to managing grazing *frequency*, *intensity*, and *opportunity* would generally allow for a broader range of management options. Vegetation treatments, structural range improvements, livestock herd management, increasing the number of pastures, and enhancing pasture rotations, are all considered important practices in creating this flexible approach. Forest-wide standard and guidelines are generally effective in protecting other resource values, and compliment other practices. However, in some specific situations, additional standards or practices, or adjustments in seasons and numbers may be needed to prevent degradation of properly functioning conditions. These standards or practices would need to be determined at the site-specific or allotment level. As a result, the approach under these MPCs would likely translate into changes in how livestock are managed. Temporary and short-term adjustments may occur depending upon drought, wildfire effects, and sagebrush community conditions. In most situations, riparian resource improvement may have a somewhat lower rate of recovery, depending upon goals and objectives for a specific area.

Direct and Indirect Effects by Alternative

Rangeland Suitability

The three Forests' capable rangelands were analyzed for grazing suitability by alternative. This analysis considered other uses or values of the area, and also identified areas where grazing may not be appropriate. See Rangeland Resources Technical Report No. 3 for more detailed information. Table RR-8 through RR-10 display the acres of suitable rangelands by Forest and the deductions used to determine suitability, by category, for each alternative. Overall, Alternatives 4 and 6 have the least amount of suitable rangelands. The following paragraphs identify the other resource considerations and their effects on the rangeland environment:

Acres Deducted Due to Recreation Conflicts - Recreation is expected to increase under all alternatives. As recreation increases, more conflicts between recreation users and livestock grazing are likely to occur. In many situations, site-specific mitigations or changes to recreation or livestock management can reduce or eliminate the conflict. However, in some situations where conflicts continue to persist, there will be continued pressure to reduce grazing. This will most likely occur in a few areas where recreation visitation is very high throughout the grazing season, where specific management area goals and objectives emphasize recreation use, where multiple recreation opportunities are occurring, and/or when recreation or livestock management flexibility is limited. Increased recreation use within an area will disrupt livestock distribution and the effectiveness of management systems, directly affecting grazing *frequency* and *intensity*, and indirectly affecting vegetative response.

Livestock grazing would also likely affect the recreational experience of some users. There are two areas on the Sawtooth National Forest (small portions of MA 4, Big Wood River; and MA 16, Howell Canyon) where this situation occurs (Table RR-10). Alternatives 2, 3, 4, 6, and 7 deduct these areas from the Sawtooth Forest's total suitable rangelands. This deduction will likely decrease the amount of head months expected in these alternatives. The deduction for the Adams/Fox Gulch area would have the greatest potential effect, as it includes the largest amount of capable acres. Also, as described in Effects Common to All Alternatives, domestic livestock grazing would be prohibited in developed recreation sites under all alternatives.

Acres Deducted Due to Closing Vacant Allotments - Closing vacant allotments eliminates the use of these areas for domestic livestock production in the future. All the allotments considered under this category are on the Boise National Forest. Areas capable of supporting livestock would be removed from the suitable grazing land base. Closures could have positive effects on other resources, but could also have negative effects on livestock management, depending on site-specific conditions. Vegetative composition and vigor would be expected to improve with these deductions, due to the limited amounts of arid or semi-arid vegetation cover types. Some southern exposures may not see significant long-term vegetative recovery due to the potential spread of non-native plants and the semi-arid conditions. Big-game winter and summer range would follow a similar pattern. Ground cover would continue to increase on more mesic sites, providing for improved soil stability, thereby reducing potential sedimentation to bull trout and other fish habitat. Vegetation management options with livestock would not necessarily be precluded with the closing of allotments. Permits could still be issued for other purposes (FSM 2234, Livestock Use Permits), such as vegetation management, research, and livestock transportation or crossing access. Nor would closing the vacant allotments automatically reduce head months currently permitted. However, closures could potentially reduce future management flexibility by eliminating the possibility of using the allotments to resolve future conflicts between livestock grazing and other resources on active allotments, or to provide alternative forage in drought years. This reduction could indirectly affect the management or use of private lands surrounding the Forest, based on the likelihood that livestock would have to leave the Forest early and return to privately owned or leased lands.

See Table RR-6 for the complete list of vacant allotments considered in this suitability deduction, and see Table RR-8 for the acres associated with the allotments removed from suitable rangeland by alternative. Alternatives 2, 3, 4, 6, and 7 would remove 32,041 acres from the suitable rangelands, based on the closure of eight vacant allotments. Alternatives 1B and 5 would not remove any acres.

Table RR-8. Boise NF Rangeland Suitability Acres by Alternative

Criteria	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Capable Acres	398,400	398,400	398,400	398,400	398,400	398,400	398,400
Vacant Allotment Acres Deducted	0	32,041	32,041	32,041	0	32,041	32,041
Anadromous Agreement Deducted	5,575	0	0	5,575	0	0	5,575
Total Deductions	0	32,041	32,041	37,616	0	32,041	37,616
Total Suitable Acres	**398,400**	**366,359**	**366,359**	**360,784**	**398,400**	**366,359**	**360,784**

Acres Deducted Due to Bighorn Sheep Habitat - Discontinuing domestic sheep grazing in overlapping areas used by domestic sheep and bighorn sheep would reduce the risk of disease being transmitted to bighorn sheep. Domestic sheep grazing would be discontinued by phasing out, on an opportunity basis, suitable rangeland portions of domestic sheep allotments that overlap current bighorn sheep habitat, or by converting use to cattle, where feasible. This action may help existing bighorn sheep populations stabilize or increase in these areas. See the *Terrestrial Habitat and Species* section for more information. Deducting the areas from the suitable rangelands for sheep may have a long-term effect on overall head months for domestic sheep within the Ecogroup area. However, the potential effect on existing sheep operators will be minimal, as this will occur on an opportunity basis only, and in relatively small areas. There are two areas where this situation exists in the Ecogroup. One area occurs in MA 11 (Rock Creek), MA 12 (Cottonwood Creek), and MA 13 (Trapper Creek/Goose Creek) of the Sawtooth Forest (66,506 acres). The other is in MA 1, Hells Canyon, on the Payette Forest (15,329 acres). Therefore, a total of 81,835 total acres of suitable range could be affected by this deduction (Tables RR-9 and RR-10). Alternatives 3, 4, and 6 include these deductions; Alternatives 1B, 2, and 5 have no deductions. Alternative 7 included only the deduction on the Sawtooth. The purpose of this change was to recognize the 1997 agreement reached by members of the Hells Canyon Bighorn Sheep Restoration Committee with the Idaho Woolgrowers Association and to identify an alternative that recognizes the Payette National Forest System lands were not considered as part of the original restoration plan.

Table RR-9. Payette Rangeland Suitability Acres by Alternative

Criteria	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Capable Acres	227,080	227,080	227,080	227,080	227,080	227,080	227,080
Bighorn Habitat Acres Deducted	0	0	15,329	15,329	0	15,329	0
Total Deductions	0	0	15,329	15,329	0	15,329	0
Total Suitable Acres	**227,080**	**227,080**	**211,751**	**211,751**	**227,080**	**211,751**	**227,080**

Acres Deducted Due to Noxious Weed Spread and Establishment - This category pertains to sites where noxious weeds are spreading and livestock use or management has been identified as a major contributing factor, or the potential benefit of using livestock to contain and control weeds would be offset by potentially greater negative affects to other resources. Two sites fall into this category, one in the Wood River drainage, and one in the South Fork Boise River drainage, both on the Sawtooth Forest. The spread on the Wood River site can be contributed in part to concentrated livestock use in large relatively dense infestations during a time when seed dissemination from the plants occurs. As a result, livestock become carriers of noxious weed seed when they are moved. The site in the Big Wood River drainage lies just above the Sawtooth NRA Headquarters. The area consists of 2,498 suitable acres and is deducted from Alternatives 4 and 6 (Table RR-10).

The South Fork Boise River site has other concerns. The occupied sites are typically dominated by leafy spurge. While it has been documented that sheep can be effective in reducing leafy spurge infestations (Olson and Lacey 1994, Non-native Plant Technical Report No. 2), some of the sites are located in areas with unstable slopes and soils within Landtype Capability Groups 6-9, which have a higher susceptibility to erosion (see Appendix G of the Forest Plans). While leafy spurge densities could be reduced through grazing treatments, the potential for additional erosion from concentrated grazing on the sites and the increased potential for new spurge seedbeds would likely offset any gains of treatment. This erosion could result in sediment delivery to the South Fork of the Boise River, particularly on south and west aspects. An estimated 3,213 suitable rangeland acres are identified within this area of concern and are deducted from Alternatives 4, 6, and 7 (Table RR-10).

Noxious weed spread will continue to occur, but likely at a lower rate. Livestock management mitigations or adjustments may or may not be practical or feasible. Therefore, preventing use by livestock in certain areas may be an appropriate management option in conjunction with other tools. Deductions would affect the amount of area available for late season grazing, the number of head months provided, and how the sheep driveway is used or managed in the fall. They could also slightly affect the amount of area available for summer grazing on five S&G allotments, and the number of head months provided. These effects could have short-term and long-term indirect impacts on some individual operators. Alternative routes or trucking with shortened grazing seasons may be part of the options for the site in the Big Wood River. If so, then livestock operation costs would likely increase and forage availability would decrease. Any decrease in forage under Alternatives 4, 6, and 7 could indirectly affect the management or use of private lands surrounding the Forest. This is based on the likelihood that livestock would have to leave the Forest early, and would return to lands privately owned or leased by the permittees. An early return would increase forage demand for a longer duration, thus causing potential management adjustments or detrimental resource effects to the private or leased lands (Knize 1999).

Alternatives 1B, 2, 3, 5, and part of 7 would address weed spread by changing livestock management and mitigating the effects of spread at the site-specific level by modifying annual operating instructions and/or part III of the term grazing permit (FSH 2209.13, Sections 16.1-16.15).

Table RR-10. Sawtooth NF Rangeland Suitability by Alternative

Criteria	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Capable Acres	535,010	535,010	535,010	535,010	535,010	535,010	535,010
Recreation Conflict Acres Deducted	0	1,253	1,253	1,253	0	1,253	1,253
Bighorn Habitat Acres Deducted	0	0	66,506	66,506	0	66,506	66,506
Noxious Weed Acres Deducted	0	0	0	5,711	0	5,711	3,213
Total Deductions	0	1,253	67,759	73,470	0	73,470	70,972
Total Suitable Acres	**535,010**	**533,757**	**467,251**	**461,540**	**535,010**	**461,540**	**464,038**

Acres Deducted Due To Agreements Implemented To Close Allotments Containing Anadromous Fish Habitat - All the allotments considered under this category are on the Boise National Forest. Closing these allotments would eliminate the use of these areas for domestic livestock production under the term grazing permit system in the future. Areas capable of supporting livestock would be removed from the suitable grazing land base. Table RR-8 displays the acres associated with the allotments removed from suitable rangeland by alternative. Alternatives 1B, 4, and 7 would remove the 5,575 acres from the suitable rangeland base and close three allotments (See Current Condition Section). Alternatives 2, 3, 5 and 6 would not remove any acres. Closures would continue to have positive and potential negative effects on other resources. Riparian vegetative composition and vigor is expected to improve at a slightly faster rate with these deductions. Most of the suitable lands are associated with riparian areas, and valley bottom meadows. Ground cover would continue to increase on more mesic sites, providing for improved soil stability and long-term productivity, thereby reducing some potential sedimentation to anadromous and bull trout habitat. Hydric and riparian woody vegetation establishment and composition would continue to improve. Vegetation management options with livestock would not necessarily be precluded with the closing of allotments. Permits could still be issued for other purposes (FSM 2234, Livestock Use Permits), such as vegetation management, research, and livestock transportation and crossing access. However, the closures would have a negative indirect effect on livestock management and forage availability. Closing the allotments would reduce 2,265 head months of permitted use. It would also potentially reduce management flexibility for sustaining livestock productivity by eliminating allotments that could be used to lower overall Forest allotment stocking.

Rangeland Vegetation Response to Grazing

The MPCs were sorted into two groups (More Restrictive and Less Restrictive) based on their approach to grazing management and their likely effects. The extent any one group is applied across the landscape varies by alternative. These alternative variations may indirectly affect the number of allotments by implementing potentially more constraining or intensive management.

Under the current term grazing permit system, authorized seasons of use and livestock numbers have generated a range of 363,116 to 543,742 head months of livestock grazing annually on the three Forests in recent years (Alternative 1B). The determination of authorized type and class of livestock, the number of head, and the season of use is analyzed at the allotment or site-specific decision level where grazing principles can be best judged. The extent that Forest Plan MPCs management direction (e.g., for protection of threatened and endangered species, improvement in water quality, reduction of soil surface erosion, improvement of aquatic and terrestrial wildlife habitat, and enhancement of rangeland vegetation) are applied, in combination with compatible livestock management practices to a specific area, will most likely determine what changes are expected to the total number of head months. Changes or adjustments in authorized head months may or may not be necessary to achieve the change or restoration needed to reach desired conditions. A simple site-specific change in one of the grazing principles (frequency, intensity or opportunity) explained in the "Factors Affecting Plant Physiology and Succession" section above, may be more effective. Actual use changes will ultimately depend on implementation of forest plan direction in conjunction with site-specific allotment planning and term grazing permit administration. Some adjustments or changes are already occurring administratively within specific watersheds and Management Areas due to the implementation of recent annual operating instructions, management plans and biological opinion terms and conditions issued by U.S. Fish and Wildlife Service and NMFS in compliance with the Endangered Species Act.

However, the concept of suitable rangelands within Less and More Restrictive MPC groupings (See Effects by Management Prescription Category section) does provide an indicator to the extent of potential adjustments in head months and authorized use for each alternative, and this concept also help defines the range of alternatives more effectively. Each alternative and its associated mix of MPCs, particularly those in the More Restrictive group, will likely have some influence on indirect short-term and long-term effects to head months. The different proportions and variations between alternatives provides a more important reference rather than what the actual numbers are. Also, the indirect effects ultimately translate into possible changes to livestock herd management, increased range improvement construction and maintenance costs, general allotment management costs, changes in seasons of use, and numbers of livestock at the site-specific level. Table RR-11 displays the amount of suitable rangeland acres occurring within grazing with Less Restrictive and More Restrictive prescriptions. This table also is a good depiction of the potential effects from the Forest Plan alternatives.

Table RR-11. Suitable Rangeland Acres With Less Restrictive and More Restrictive MPCs

Forest	MPC Grouping	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	More restrictive	26,000	40,020	62,180	232,180	11,250	113,380	32,430
	Less restrictive	372,390	326,340	304,180	128,600	387,140	252,980	328,360
Payette	More restrictive	11,360	19,120	59,630	206,120	16,560	79,590	62,080
	Less restrictive	215,720	207,960	152,120	5,640	210,520	132,160	165,000
Sawtooth	More restrictive	36,950	82,850	94,680	255,560	7,090	271,580	116,370
	Less restrictive	498,060	450,910	372,570	205,980	527,920	189,960	347,670
Ecogroup Totals	More restrictive	74,310	141,990	216,490	**693,860***	34,900	364,550	210,880
	Less restrictive	**1,086,170**	**985,210**	**828,870**	340,220	**1,125,580**	**575,100**	**841,030**

*Bold lettering indicates whether largest proportion of acreages occurs in either More Restrictive or Less Restrictive category.

With the exception of Alternative 4, the variation between the alternative's different MPC groupings and their effect on domestic sheep would not be expected to vary the head months greatly for the Boise and Payette Forests. However, the Sawtooth National Forest, mostly in the northern portion, has greater variations, due to the wider range of MPC differences between the alternatives. The differences reflect changes in alternative standards and guidelines for grazing capacity determinations, the emphasis on other resource values, specific resource protection measures, and utilization standards. The changes do not necessarily reflect an "across the Forest" effect. The greatest potential changes to cattle pasture seasons of use, numbers of livestock, head months and management costs across the three Forests would most likely be associated with Alternative 4 and Alternative 6 (Sawtooth N.F. only). Changes would be due to the likelihood of an increased number of standards, mostly relating to grazing *intensity* (see Grazing Factors Affecting Plant Physiology and Succession). The intent of these standards would be to ensure greater and faster recovery of upland and riparian communities across a broader extent of the Forests' landscapes (See Table RR-11). Alternative 6 reflects the next greatest change, although it is significantly less than Alternative 4. The indirect effects of this alternative would be similar to Alternative 4, but would be more confined to specific watersheds or management areas where threatened and endangered aquatic species habitat exists. Individual and community effects would depend on their connection to these watersheds or management areas. Alternative 3 and 7 are fairly similar but would have a smaller scale of effects. Alternatives 1B and 5 are relatively comparable in their outcomes and would produce the least amount of change over time. However, additional and more range-related investments and structural mitigations by the permittees and Forest Service would likely be needed under these two alternatives in order to sustain forage levels. As a result, more demands would likely occur on permittee and Forest budgets, which are already strained (see Budget Allocations, in the Current Condition section).

As stated earlier, direction for all alternatives has been developed to maintain or improve rangeland conditions on National Forest administered lands. However, the rates of improvement and the number of practices available for application may vary depending on specific Management Area direction and emphasis. In most situations, riparian resource improvement may have slightly higher short-term rates of recovery for Alternatives 4 and 6. However, those management areas with low-elevation, arid and semi-arid upland vegetation types that contain the More Restrictive MPC groupings will likely see some initial surges in riparian recovery followed by slower recovery, due to upland influences on instream and channel processes.

Cumulative Effects

Many ranchers depend on allotments administered by the Forest Service, Bureau of Land Management, and State of Idaho Department of Lands to provide a portion of their year-round grazing operations. The three Ecogroup Forests will continue to support many viable livestock operations. Overall, a slight decline in the demand for livestock grazing can be expected over the life of this plan (short term), as private land development, higher property values, and conflicts between livestock operations and recreation uses increase in the more urban areas close to the Forests. This decline could lead to a slight decline in the desirability and feasibility of some allotments to be used for livestock production.

Over the last two decades, the Forests have seen a decline in the amount of forage authorized under term grazing permits, due to several reasons. This trend is expected to continue, but at a slower rate during the short term. Livestock operation costs are expected to continue rising, and livestock market price fluctuations—in what has become an international market—will continue to occur. As result, operation economies of scale will become more important. The number of small livestock operators and permittees will become fewer in number, as base properties or livestock are sold for financial reasons. This will contribute to the current declining trend for ranches. Over 40 years, the number of ranches in the west has dropped 56 percent, from 2.3 million to one million (Slivka and Barker 2002). The number of permittees on the three Forests will become fewer with this likely trend. The remaining permittees will have larger livestock holdings and greater numbers of permitted livestock. The combining of some allotments will occur as a part of this process, thus increasing the number of pastures available for use during the grazing season. This situation will allow for greater seasonal management flexibility and shorter pasture durations, both of which will lead to improved grazing opportunity and frequency (See *Effects Common to All Alternatives*, above). If sagebrush treatment occurs at the necessary levels identified in the *Vegetation Diversity* section, forest plan management direction will lead to improved rangeland conditions and a stable and sustainable level of forage production under all alternatives. Otherwise, livestock forage production can expect further declines with the implementation of Forest-wide utilization standards and continued declines in sagebrush understory vegetation.

As ranches are sold and subdivided, there will continue to be a net loss of open space that contributes to an existing annual western states land consumption growth rate of 3.6% (Christensen 2002). The demand for subdivided land is not expected to decrease in the short and long term (see the expected population growth rates for this region during the next two decades in the Socio-Economic section of this chapter). The subdividing of lands will likely continue to occur in the short term for Blaine and Ada Counties. Valley County could experience this situation also, depending on the level of resort, recreation, and second home growth experienced. Adams, Camas, Boise, Gem and Elmore Counties may experience similar but lower growth rate conditions in the long term. In some cases, a loss of big-game winter and spring range may occur, particularly in Ada, Blaine, Elmore, and Gem counties, resulting in marginal winter habitat being used more frequently. This loss may lead to increases in localized competition between livestock and wildlife. Also, overall plant and animal diversity on private ownership would be expected to decline with the reduction of open space (Christensen 2002, Knight 2003, McDonald 2003, Maestas et al. 2002, Maestas et al. 2003, Mitchell et al. 2002, Odel and Knight 2001). Research in Colorado, Montana, and New Mexico has demonstrated that the presence of certain species of wildlife and plants decrease, and invasive plant species increase, with fragmentation of land ownership into 40 acre parcels or less (see Rangeland Resources Technical Report No. 3 for more detailed information). An indirect long-term consequence of this trend may be localized areas of reduced grazing *opportunity* and *frequency*.

Timberland Resources

INTRODUCTION

Forested lands were assessed, during development of Forest Plans, to determine their suitability for timber production. Timberlands previously identified as not suited for timber production are required by the National Forest Management Act (1976) to be reassessed every 10 years. Additionally, changes in land ownership, allocation of some land to specific uses, and new technology available for assessing land status, have all contributed to the recognition that a complete reassessment of timberland suitability is warranted.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect the amount of suited timberlands and sustainable timber managed by the Forests.

Background to Issue - The development of Need for Change issues and public scoping resulted in the identification of issues related to timberland suitability and management. Comments received on timber suitability and management revealed a wide range of opinions, including opposing points of view on how and how much timber should be managed. Issues developed from the comments address two primary areas of interest, including how much land and which lands are included as suited timberlands, and what is the sustainable level of timber harvest.

Concerns related to timber management were also raised over costs and values of implementation, supply and demand for timber, and effects on community stability. These concerns are addressed in the *Socio-economic Environment* section of Chapter 3.

Development of direction for vegetation management actions designed to provide for short- and long-term biological, physical, economic and social sustainability, and timberland suitability were identified as Need For Change topics in the *Preliminary Analysis of the Management Situation* (USDA Forest Service 1997). Vegetation management activities need to be developed in a manner that incorporates landscape-level disturbance regimes. These activities also need to provide for species viability and biodiversity, while also providing for goods and services to meet part of the social and economic demands of both local and regional communities.

Timberlands previously identified as not suited for timber production are required to be reassessed every 10 years. Additionally, changes in land ownership, allocation of some land to specific uses, and new technology available for assessing land status have all contributed to the recognition that a complete reassessment of timberland suitability is warranted.

Indicators - Indicators associated with each of the issues provide a means to analyze differences between alternatives, and the way in which an issue is addressed. The following indicators are used to evaluate effects of the timber-related issues by alternative:

- *Suited Timberlands*. This indicator will vary by alternative. It will describe the total area available for timber management, and also which lands will be used to calculate the Allowable Sale Quantity (ASQ). The analysis will display acres of timberland identified as tentatively suited, and acres of tentatively suited timberland identified as appropriate for timber management. Lands considered appropriate for timber management may include timberlands within riparian conservation areas and areas predicted as having landslide potential. Suited timberland acres in these areas will vary by alternative.

- *Potential yield of timber and other wood products*. Two different measures will be used for this indicator: 1) ASQ, and 2) total sale program quantity (TSPQ). ASQ is a measure of the maximum amount of timber that can be offered for sale each decade. Timber that contributes to ASQ comes from suited timberlands. The calculated ASQ volume is the amount of timber that is available on a continuous or sustainable basis, from the suited timberlands, based on current conditions of suited timberland acres, and the expected yields associated with planned management actions. Changes in either or both of these elements may change the calculated ASQ volume. TSPQ is a measure of the total amount of timber and other wood products that could be produced by each alternative. TSPQ includes all of the ASQ volume plus an additional volume of wood products (e.g., fuelwood, post, poles, etc.) that may come from both suited and not suited timberlands.

Affected Area

The affected areas for direct, indirect and cumulative effects to timberland resources are the lands administered by the three National Forests in southwest Idaho, the Boise, Payette and Sawtooth National Forests. This area represents the National Forest System lands where management actions may result in changes to forest vegetation.

CURRENT CONDITIONS

Prehistoric and Historic Influences

The greatest influence on vegetation patterns and distribution comes from soil types and climatic regimes. However, fire ignited by both lightning and Native Americans strongly influenced the pattern and distribution of vegetation mosaics and the distribution of age classes. Local artifacts indicate that the ancestors of Native American tribes have occupied the Ecogroup area for at least 8,000 to 10,000 years. Archeological records have given us a clearer picture of what the landscape probably looked like while these ancestors lived here. Native Americans kept traditional hunting and gathering areas in an open condition through deliberate seasonal burning. Fires were set to drive mountain sheep toward traps, encourage new growth in meadows, clear encroaching brush, and rejuvenate plants needed for baskets, arrows, and other necessities. The occurrence and severity of fires ignited by lightning was dependent on local site and vegetation conditions. In general, at low elevations on the warm dry sites, fires occurred frequently and maintained stands in relatively open conditions with minor accumulations of woody fuel. At mid-elevation sites, fires generally occurred with less frequency, allowing for the development of stands with more closed or denser vegetation and greater fuel accumulations. This resulted in a greater variety of fire conditions, ranging from low-intensity ground fires typical of the low-elevation forests, to high-intensity stand-replacing fires in which entire stands of trees were killed. In the high-elevation cold forest types, fires occurred at infrequent intervals. In these cold forest types, other physiographic features and disturbance events, such as insect epidemics, disease occurrences, and wind damage, played a greater role in influencing vegetation development, patterns, and distribution.

The discovery of gold in the Idaho Territory around 1860 began to bring miners and other settlers to the area in great numbers. Communities seemingly sprang up overnight in mountain locations like Warren, Idaho City, Sawtooth City, and Atlanta. People in these communities depended on natural resources in the surrounding areas to meet many of their needs, including wood for construction, mine timbers, and fuel. The majority of wood was used to meet the need for fuel, used for both heating and cooking. The actual quantities of wood used are not well documented, probably because there was no apparent need to either inventory or record the amount consumed for a resource that was considered abundant. However, a few records leave the impression that wood was used extensively, with woodcutters in high demand. One such account is provided by Susan M. Stacy in, *Legacy of Light, a History of the Idaho Power Company* (Stacy 1991), in which she states:

> "Having enough fuel was always a problem even after mining equipment improved in the 1860s. Throughout the Owyhee Mountains, the Chinese labored at woodcamps, and the newspaper was full of offers of free room and board for woodcutters."

Another example of the use of wood near mining settlement is described in *Snapshot In Time: Repeat Photography on the Boise National Forest 1870 - 1992* (USDA Forest Service 1993). A description on page 13 states, "Historic photographs show that mining areas were generally stripped or clear cut of any forest cover". As late as 1880, practically all of the fuel used in Idaho came from wood (Williams 1989). This intensive use of wood over time depleted the accessible timber in the areas surrounding communities.

The prevailing sentiment during this period of western expansion was that natural resources were inexhaustible and there for the taking. As the settler populations and resource needs increased, so did their effects on the environment. As noted above, vegetation patterns began to change substantially in and around mining and agricultural communities. The role and use of fire changed considerably during this time. The settlers essentially viewed fire as a potential threat to life and property. This attitude led to increased fire suppression in order to protect homes, crops, and other development from destruction. After 1900, fire lookouts began to appear. Early fire suppression efforts were generally effective because fuels were often sparse, particularly in vegetation groups that historically burned with frequent, non-lethal fire. These efforts continued to improve as heavy equipment and aircraft became more available. The development and improvement of road systems also increased access for suppression and created fuel breaks.

Following World War II, the baby boom fueled a nationwide demand for affordable housing, which increased timber production throughout the West. An extensive system of roads was developed on National Forest lands to access timber stands in the Ecogroup area. This accelerated harvest and road building continued well into the latter half of the twentieth century.

The combined influences of timber harvest, roads construction, fire suppression, and agriculture affected vegetative communities. In harvest areas, stand densities and species composition were substantially altered, generally resulting in a reduction of large-sized, high-valued tree species. Timber-harvest-created openings were readily regenerated by tree species that are more tolerant of partial shade conditions. These effects, combined with fire exclusion, resulted in stands developing uncharacteristically high level of tree density, fuel loading, and climax species. On the other hand, commodity production and development of roads provided economic and social benefits to many people in the form of jobs and income, wood fiber, receipts to counties, improved access, and opportunities for recreational activities.

Current Timber Conditions

Each Forest in the Ecogroup has completed an inventory of timber resources since 1992; lands within wilderness areas were not inventoried. The inventory data are used to characterize the present condition of forest vegetation. Inventory data elements that have been summarized include timber volumes, timber growth capacity (productivity), and distribution of timber by size classes. Tables T-1 through T-6 display summarized data representing current timber conditions on the three Forests. The acreages for suited and not suited timberlands are representative of the management prescription category allocations in Alternative 7. Volume is presented in thousands of board feet (MBF) and thousands of cubic feet (MCF).

Table T-1. Present Timber Conditions on the Boise National Forest

Conditions	Suited Timberland Acres		Acres Not Appropriate for Timber Production (Not Suited)	
Present Forest Growing Stock	4,758,580 MBF	878,810 MCF	10,801,330 MBF	2,106,480 MCF
Live Cull	196,760 MBF	38,470 MCF	571,150 MBF	112,620 MCF
Salvageable Dead	85,500 MBF	15,820 MCF	266,600 MBF	51,710 MCF
Annual net growth	10,020 MBF	100 MCF	- 59,640 MBF	- 10,570 MCF
Annual mortality	101,700 MBF	20,040 MCF	313,960 MBF	59,530 MCF
Size Class Distribution Acres (Percent of Total)				
Grass/Forb/Shrub/Seedling	113,900 (21.6%)		237,400 (20.7%)	
Sapling trees	43,400 (8.2%)		90,150 (7.8%)	
Small trees	140,700 (26.7%)		404,100 (35.2%)	
Medium trees	163,950 (31.1%)		304,300 (26.5%)	
Large trees	65,550 (12.4%)		113,300 (9.8%)	

Table T-2. Present Timber Conditions on the Payette National Forest

Conditions	Suited Timberland Acres		Acres Not Appropriate for Timber Production (Not Suited)	
Present Forest Growing Stock	4,125,000 MBF	858,000 MCF	13,430,610 MBF	2,818,770 MCF
Live Cull	194,040 MBF	34,650 MCF	633,394 MBF	112,750 MCF
Salvageable Dead	573,210 MBF	119,130 MCF	3,888,244 MBF	807,494 MCF
Annual net growth	66,330 MBF	12,210 MCF	215,533 MBF	39,794 MCF
Annual mortality	16,170 MBF	3,300 MCF	109,435 MBF	23,213 MCF
Size Class Distribution Acres (Percent of Total)				
Grass/Forb/Shrub/Seedling	94,500 (28.6%)		383,700 (23.0%)	
Sapling trees	20,700 (6.3%)		98,900 (5.9%)	
Small trees	68,800 (20.8%)		579,600 (34.8%)	
Medium trees	89,600 (27.2%)		375,800 (22.5%)	
Large trees	56,400 (17.1%)		229,800 (13.8%)	

Table T-3. Present Timber Conditions on the Sawtooth National Forest

Conditions	Suited Timberland Acres		Acres Not Appropriate for Timber Production (Not Suited)	
Present Forest Growing Stock	1,141,700 MBF	252,200 MCF	7,671,800 MBF	1,658,100 MCF
Live Cull	27,400 MBF	5,900 MCF	136,400 MBF	35,000 MCF
Salvageable Dead	55,200 MBF	14,600 MCF	914,700 MBF	246,600 MCF
Annual net growth	- 5,300 MBF	- 1,400 MCF	- 16,300 MBF	2,200 MCF
Annual mortality	29,200 MBF	6,200 MCF	115,000 MBF	23,600 MCF
Size Class Distribution Acres (Percent of Total)				
Grass/Forb/Shrub/Seedling	20,300 (14.4%)		145,700 (16.2%)	
Sapling trees	21,500 (15.2%)		114,900 (12.8%)	
Small trees	47,500 (33.6%)		363,400 (40.5%)	
Medium trees	38,100 (26.9%)		163,800 (18.2%)	
Large trees	14,000 (9.9%)		110,300 (12.3%)	

Table T-4. Timber Productivity Classification for the Boise National Forest

Potential Growth (Cubic feet/acre/year)	Suited Lands (Acres)	Not Suited Lands (Acres)
Less than 20	0	0
20-49	99,600	535,700
50-84	276,300	467,900
85-119	151,600	145,576
120-164	0	0
165-224	0	0
225+	0	0

Table T-5. Timber Productivity Classification for the Payette National Forest

Potential Growth (Cubic feet/acre/year)	Suited Lands (Acres)	Not Suited Lands (Acres)
Less than 20	0	0
20-49	10,400	494,700
50-84	142,700	890,900
85-119	176,900	281,100
120-164	0	0
165-224	0	0
225+	0	0

Table T-6. Timber Productivity Classification for the Sawtooth National Forest

Potential Growth (Cubic feet/acre/year)	Suited Lands (Acres)	Not Suited Lands (Acres)
Less than 20	0	0
20-49	94,500	566,900
50-84	35,200	305,500
85-119	11,700	25,700
120-164	0	0
165-224	0	0
225+	0	0

Timberland Suitability

Tentatively suited timberlands have been reassessed as part of Forest Plan revision for all three National Forests. Reassessment of tentatively suited timberlands was accomplished in accordance with Forest Plan regulations 36 CFR § 219.14 and Forest Service Handbook FSH 2409.13 Chapter 20, and is fully described in Appendix E. The National Forest Management Act requires that, as a minimum, lands previously identified as not suited be reassessed at least every 10 years. The current efforts to revise the Forest Plans coincide with the need to reassess not suited timberlands; therefore, a complete reassessment of suited timberlands was done. This has allowed for a comprehensive examination of the status of timberlands on each National Forest, thus taking into account changes since the previous assessment of timberlands. Some of these changes include adjustments in land ownership, increased knowledge and experience with reforestation efforts, and increased knowledge and experience with timber management effects on soils and water quality.

The assessment was accomplished using Geographic Information System (GIS) technology. Use of GIS provides consistency in identifying each of the following data elements, which, when taken together, identify unsuitable lands, or in other words, those lands that are not capable or not available for timber production:

- National Forest lands that have been withdrawn from timber production.
- National Forest lands exclusive of withdrawn areas that are not forested.
- Available forested land that is physically unsuited for timber production, due to the inability to assure adequate restocking, or due to potential for irreversible damage to soils or watersheds.

The forested lands remaining after identifying unsuitable lands are those that are available and capable of timber production, also referred to as tentatively suited.

Tentatively suited timberlands represent the forestland area that is available and capable for sustainable timber production. These lands, therefore, represent the maximum number of acres that could be managed for regular and predictable timber outputs, and are the lands used in determining the ASQ for each Forest. Table T-7 displays the results of the tentatively suited timberlands assessment for the proposed forest plans, and compares that data with tentatively suited timberlands for the current forest plans. Differences are due to a variety of factors including land exchanges, different methods used to classify forest vegetation, and different methods used to determine acreages.

Table T-7. Tentatively Suited Timberlands, Current Vs. Proposed Forest Plans

National Forest	Current Plans Tentatively Suited Acres	Proposed Forest Plan Tentatively Suited Acres	Difference (Acres)	Percent of Current Forest Plan Tent. Suited Acres
Boise	1,272,000	1,478,000	+ 206,000	116%
Payette	821,000	1,110,000	+ 289,000	135%
Sawtooth	240,640	715,000	+ 474,360	297%
Totals	**2,333,640**	**3,299,000**	**+ 969,360**	**141%**

The large difference indicated for the Sawtooth National Forest is due largely to the method used in assessing tentatively suited timberlands for the current forest plan. Forested lands that were considered as being not appropriate for timber production were subtracted from the net forested acres in the previous assessment. This included the treatment of proposed wilderness as withdrawn for timber production, and identifying a large area as physically not suited because timber management would be inconsistent with other resource objectives. Following the procedures used for the current assessment these lands would have been identified as tentatively suited. They then could have been identified as not appropriate for timber production, thus having a direct influence on the lands identified as being suited for timber production.

Only suited timberlands can be managed for regular and predictable timber outputs. These are the lands that are considered as being appropriate for timber management. Suited timberlands are identified separately for each alternative addressing issues specific to the alternative.

Forested lands, in potential vegetation groups 2 through 10, and in management prescription categories 2.1 (scenic and recreational segments of wild and scenic river corridors), 4.2, 5.1, 5.2, 6.1, and 6.2 were identified as suited timberlands for the proposed forest plans. The following tables, T-8 through T-10, display the proposed forest plan tentatively suited, and suited timberland acres for each National Forest in the Ecogroup. The tables also provide a comparison with the current forest plan acres.

Table T-8. Boise National Forest Land Classification

Classification	Current Forest Plan Acres	Proposed Forest Plan Acres
1. Non-forest Land (includes water)	309,000	525,800
2. Forest Land	1,955,000	1,668,600
3. Forested Land withdrawn from timber production	61,000	12,800
4. Forest land not capable of producing crops of industrial wood	0	0
5. Forest land physically unsuitable --irreversible damage likely to occur --not restockable within 5 years	622,000	180,700
6. Forest land--inadequate information*	0	0
7. Tentatively suitable forest land (item 2 minus items 3, 4, 5, & 6)	1,272,000	1,475,100
8. Forest land not appropriate for timber production**	616,000	947,600
9. Unsuitable forest land (items 3, 4, 5, 6, and 8)	1,299,000	1,141,100
10. Total suited forest land (item 2 minus item 9)	656,000	527,500
11. Total national forest land (items 1 and 2)	2,264,000	2,201,400

* Lands for which current information is inadequate to project responses to timber management. Usually applies to low site lands.
** In the Forest plan, disaggregate the acreage of lands identified as not appropriate for timber production by: (a) minimum management requirements; (b) multiple-use objectives; and (c) cost efficiency (FSH 2409.13-23).

Table T-9. Payette National Forest Land Classification

Classification	Current Forest Plan Acres	Proposed Forest Plan Acres
1. Non-forest Land (includes water)	168,000	387,000
2. Forest Land	2,128,000	1,921,000
3. Forested Land withdrawn from timber production	655,000	666,000
4. Forest land not capable of producing crops of industrial wood	0	0
5. Forest land physically unsuitable --irreversible damage likely to occur --not restockable within 5 years	652,000	382,000
6. Forest land--inadequate information*	0	0
7. Tentatively suitable forest land (item 2 minus items 3, 4, 5, & 6)	821,000	1,109,300
8. Forest land not appropriate for timber production**	389,000	789,300
9. Unsuitable forest land (items 3, 4, 5, 6, and 8)	1,696,000	1,668,100
10. Total suited forest land (item 2 minus item 9)	432,000	330,000
11. Total national forest land (items 1 and 2)	2,296,000	2,299,300

* Lands for which current information is inadequate to project responses to timber management. Usually applies to low site lands.
** In the Forest plan, disaggregate the acreage of lands identified as not appropriate for timber production by: (a) minimum management requirements; (b) multiple-use objectives; and (c) cost efficiency (FSH 2409.13-23).

Table T-10. Sawtooth National Forest Land Classification

Classification	Current Forest Plan Acres	Proposed Forest Plan Acres
1. Non-forest Land (includes water)	1,412,000	1,020,000
2. Forest Land	678,000	1,091,000
3. Forested Land withdrawn from timber production	133,000	112,000
4. Forest land not capable of producing crops of industrial wood	113,000	52,700
5. Forest land physically unsuitable --irreversible damage likely to occur --not restockable within 5 years	191,000	211,300
6. Forest land--inadequate information*	0	0
7. Tentatively suitable forest land (item 2 minus items 3, 4, 5, & 6)	241,000	715,000
8. Forest land not appropriate for timber production**	142,000	573,500
9. Unsuitable forest land (items 3, 4, 5, 6, and 8)	579,000	949,500
10. Total suited forest land (item 2 minus item 9)	99,000	141,500
11. Total national forest land (items 1 and 2)	2,101,000	2,111,000

* Lands for which current information is inadequate to project responses to timber management. Usually applies to low site lands.
** In the Forest plan, disaggregate the acreage of lands identified as not appropriate for timber production by: (a) minimum management requirements; (b) multiple-use objectives; and (c) cost efficiency (FSH 2409.13-23).

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Resource protection has been integrated into timberland management direction at various scales, from national to site-specific. The cumulative positive effect of the multi-dimensional direction described below is beneficial protection and mitigation for all resources that may potentially be adversely affected by timber management activities.

Laws, Regulations, and Policies – Numerous laws, regulations, and policies govern the classification use and administration of timberland resources on National Forest System lands. Some of the more important ones are described in Appendix H in the revised Forest Plans, Legal and Administrative Framework. National laws and regulations have also been interpreted for implementation in Forest Service Manuals, Handbooks, and Regional Guides. All timber management activities and the assessment of suited timberlands must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation of vegetation management practices, and for protection of related resources.

Forest Plan Direction – Forest Plan management direction for timberland resources varies somewhat by alternative, however, direction for all alternatives has been developed to maintain forest vegetation within desired conditions, or to promote the development of desired vegetation conditions, on National Forest System lands. Direction occurs at both the Forest-wide and Management Area levels. Goals and objectives have been designed to achieve desired forest vegetation conditions over the long term, and to provide sustainable levels of timber production, while maintaining or restoring ecosystem functions and processes. Timber management standards and guidelines have been designed to protect other resources that could be adversely affected by vegetation management activities. Furthermore, management direction for other resource programs—such as soil, water, riparian, aquatic, wildlife, and recreation—provide additional guidance and resource protection in an integrated manner.

Forest Plan Implementation - Proper timber management depends on current and site-specific information about biophysical conditions and the effects that management practices have on affected resources. Some of these factors are not appropriately addressed at the programmatic level, whereas other factors may be similar to all alternatives. The development of stand-level silvicultural prescriptions will address all site and related resource factors. Through this process, which is the same for all alternatives, adjustments in management practices would be made to address resource concerns in a timely, effective, and site-specific manner. Additionally, site-specific evaluations will be used to verify the timberland suitability classification of the site.

Forested Land Identified As Tentatively Suited

Forested vegetation is comprised of conifer trees and associated broadleaf trees and understory vegetation such as shrubs, forbs, and grasses. Forested vegetation can be classified by habitat types which, when grouped together, are referred to as potential vegetation groups (PVGs). The PVGs include forested stands in a wide range of successional and growth stages, and most are, or will be, dominated by conifer species that have commercial value. Forest vegetation changes as a result of growth and disturbance processes. These changes are characterized by changes in species composition, tree size and canopy closure. The most common causes for change in forest vegetation come from tree growth and development, timber harvest, fire, and insect activity. Minor changes are associated with livestock grazing, wildlife concentrations, and recreation activities. Development of forest vegetation may also be influenced by diseases such as blister rust, mistletoe, or root rot, and by climatic disturbances such as wind, flood, and drought.

National Forest lands are periodically assessed to determine whether they are suited for timber production. The analysis begins by identifying those lands that are not available and capable of being managed for timber production. This specifically results in the identification of:

1) National Forest lands that do not and cannot support forest vegetation,

2) Lands that have been formally withdrawn from timber production, such as designated wilderness,

3) Forested lands where restocking of tree seedlings can not be assured within 5 years following timber harvest, and

4) Lands where timber production may result in irreversible resource damage to soil productivity or watershed conditions.

Lands that possess any one of the above conditions are classified as not suited for timber production. The remaining lands are classified as tentatively suited for timber production. These lands are legally available, and biologically and physically capable of timber production. This classification is the same for all alternatives, or in other words, the area identified as capable and available for timber production does not vary by alternative.

Lands classified as tentatively suited for timber production are further evaluated to determine whether they are appropriate for timber production. The tentatively suited timberlands identified as being appropriate for timber production are classified as suited timberlands. This will be discussed in greater detail below.

The assessment of tentatively suited timberlands for the revision of the Ecogroup forest plans has yielded the following data for each Forest, summarized in Table T-11.

Table T-11. Tentatively Suited Timberland Acres Within the Ecogroup

Forest or Indicator	Forested Acres	Not Tentatively Suited Acres (Non-forested)	Not Tentatively Suited Acres (Forested)	Tentatively Suited Acres	Total Forest and Ecogroup Acres (all cover types)
Boise	1,668,600	532,800	193,500	1,475,100	2,201,400
Payette	1,998,100	311,200	878,800	1,109,300	2,299,300
Sawtooth	1,091,000	1,020,000	376,000	715,000	2,111,000
Ecogroup Totals	4,757,700	1,864,000	1,448,300	3,299,400	6,611,700
Total Not Tentatively Suited Acres		3,312,300			

Within the Ecogroup area, 4,757,700 acres are classified as forested; of these 3,299,400 acres are tentatively suited, or in other words, capable and available for timber management. Tentatively suited forestlands are further analyzed to determine the total area appropriate for timber management. Suited timberlands are determined separately, and are described for each alternative. Detailed information concerning the determination of tentatively suited acres, and the lands suited for timber management is in Appendix E.

Acres Of Tentatively Suited Lands In Inventoried Roadless Areas

Inventoried roadless areas will not vary by alternative, and thus, the acres of tentatively suited timberland that occur within inventoried roadless area will not change by alternative. The assessment of tentatively suited timberlands is not influenced by the inventory of roadless areas, but the allocation of management prescription categories will determine which tentatively suited timberlands are appropriate for timber management, including those within inventoried roadless areas. The following table summarizes the inventoried roadless areas, and the acres of tentatively suited timberland within inventoried roadless areas in each Forest.

Table T-12. Tentatively Suited Acres Within Ecogroup Inventoried Roadless Areas

Forest	Inventoried Roadless Area Acres	Tentatively Suited Timberland Acres within Inventoried Roadless Areas
Boise	1,108,500	729,100
Payette	908,200	635,800
Sawtooth	1,225,500	497,400
Ecogroup Total	**3,242,200**	**1,862,300**

Using the data from the two tables above reveals that an estimated 56.4 percent of the tentatively suited timberland acres in the Ecogroup are located within inventoried roadless areas (Boise – 49.3 percent, Payette – 57.3 percent, and Sawtooth – 69.6 percent).

Direct and Indirect Effects by Alternative

Acres of Tentatively Suited Identified As Appropriate For Timber Management

Lands considered as being appropriate for timber management, also referred to as suited timberlands, are identified separately for each alternative. Tentatively suited lands are identified as not appropriate for timber production when management goals and objectives are not consistent with timber production on a sustained yield basis. Conversely, tentatively suited timberlands are identified as being appropriate for timber production where timber management is compatible with other land and resource goals and objectives.

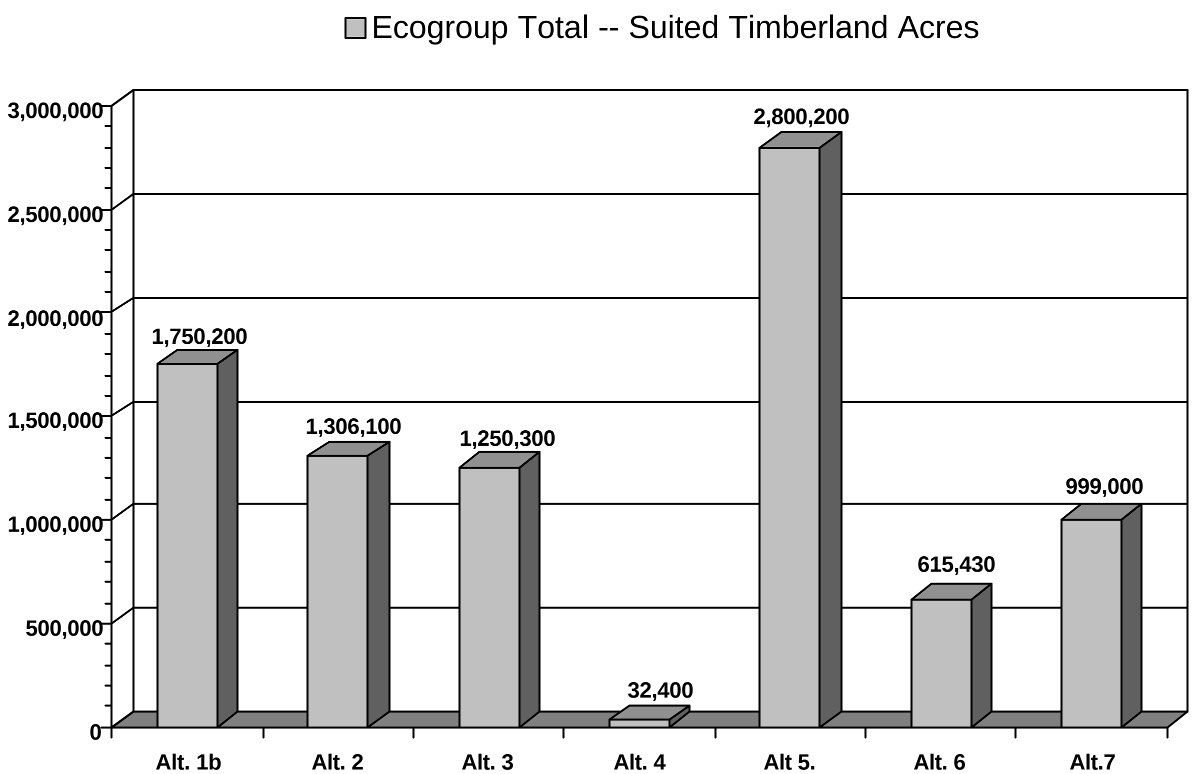
Establishing goals and objectives was accomplished in part by assigning management prescription categories (MPCs) to individual subwatersheds or other identified areas. The MPCs provide a range of resource protection considerations and management opportunities. Each MPC defines whether tentatively suited timberlands will be identified as being appropriate for timber management, or in other words, identified as suited timberland. MPCs 2.1 (scenic and recreational segments of wild and scenic river corridors), 4.2, 5.1, 5.2, 6.1, and 6.2 define tentatively suited timberland as suited timberland. Timberlands in all other MPCs are not suited.

Each MPC allocation considered a variety of conditions, including whether the subwatershed included tentatively suited timberland and associated timber management goals. Although MPCs 2.1 (scenic and recreational segments of wild and scenic river corridors), 4.2, 5.1, 5.2, 6.1, and 6.2 all contain suited timberland, not all lands within these MPCs are necessarily appropriate for timber management. Certain areas or habitat types may be unsuited because they are not physically capable of producing timber on a sustained yield basis. The MPC allocations combined with tentatively suited timberland acres result in the identification of the acres that are appropriate for timber management in each alternative. Table T-13 lists the suited timberland acres by forest and the total for the Ecogroup for each alternative. Figure T-1 provides a graphical display of the Ecogroup suited timberland acres for each alternative.

Table T-13. Suited Timberland Acres by Alternative

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	922,000	746,000	649,400	9,300	1,309,800	330,300	527,500
Payette	438,100	358,600	373,900	0	895,100	240,000	330,000
Sawtooth	390,100	201,500	227,000	23,100	595,300	45,130	141,500
Ecogroup Totals	**1,750,200**	**1,306,100**	**1,250,300**	**32,400**	**2,800,200**	**615,430**	**999,000**

Figure T-1. Suited Timberland Acres by Alternative for the Ecogroup



For the Ecogroup, timber management would be considered appropriate on 85 percent of tentatively suited timberlands in Alternative 5, compared to 53 percent in Alternative 1B, 40 percent in Alternative 2, 38 percent in Alternative 3, 30 percent in Alternative 7, 19 percent in Alternative 6, and 1 percent in Alternative 4. The ranking of suited timberlands by alternative for the Payette and the Sawtooth National Forests shows the greatest amount of suited timberlands in Alternative 5, followed in decreasing order by Alternatives 1B, 3, 2, 7, 6, and 4. The ranking on the Boise National Forest is similar but the order of alternatives 2 and 3 are reversed. Therefore, the Boise National Forest ranking shows Alternative 5, with the greatest area identified as suited timberland followed in order by Alternatives 1B, 2, 3, 7, 6, and 4. Differences between forests are due to the allocation of MPCs by alternative.

As mentioned above, factors other than MPC allocations affect the amount of suited timberlands in the alternatives. Two of these factors are riparian and landslide-prone areas that have been delineated for special protection. These effects are discussed below.

Suited Timberland Acres Within Riparian Conservation Areas – Forested lands within Riparian Conservation Areas (RCAs) are defined as not suited timberlands in Alternatives 1B, 2, 3, 4, 6 and 7. They may be suited in Alternative 5. With the exception of Alternative 5, these areas have been specifically identified as not suited for a sustainable and predictable yield of timber. However, timber harvest and related mechanical treatment methods may occur as part of restoration activities designed to move current conditions closer to desired conditions for vegetation and related riparian and aquatic resources. The full range of mechanical treatment activities will be available for use on forested lands within RCAs, but will only occur when their use will avoid long-term degradation of desired conditions for soil, water, riparian, and aquatic resources. The potential for temporary and short-term impacts to these resources would likely vary by alternative because the area of mechanically treated lands and the type of treatment may vary by alternative.

Suited Timberland Acres On Sites Predicted To Be Landslide Prone - The incidence of slope failure can be influenced by timber management activities. Harvest practices that reduce, below threshold levels, the capacity of roots to help anchor soil to the underlying bedrock, and practices that increase soil moisture on inherently unstable sites, can increase the likelihood of landslide events. This is especially true on non-cohesive soil types, on steep sites, and on sites where the shape of the slope or underlying geological features naturally cause subsurface soil moisture to be concentrated.

Management direction for all alternatives includes provisions designed to reduce or eliminate adverse affects from vegetation management practices within RCAs, and to reduce the likelihood of slope failure on landslide prone areas. Provisions include standards that modify management activities, and requirements to locate and evaluate potential landslide prone areas.

Table T-14 shows the acres of tentatively suited timberlands identified as not appropriate for timber production within RCAs and on landslide prone areas. The area identified as not appropriate for timber production varies by alternative representing the combined effects of land allocation to the various management prescription categories, efforts to meet the intent of interim measures included in the Pacfish and Infish Environmental Assessments and biological opinions for bull trout and steelhead, and the different alternative themes. Appendix B provides additional details describing which riparian conservation areas and landslide prone areas are identified as not appropriate for timber production.

Table T-14. Acres Not Appropriate for Timber Production in RCAs and on Landslide Prone Areas by Alternative

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	245,600	190,000	180,400	67,700	0	77,600	144,300
Payette	89,200	61,600	73,800	3,600	0	41,100	56,600
Sawtooth	84,800	44,500	53,100	6,600	0	11,300	33,600
Ecogroup Totals	**419,600**	**296,100**	**307,300**	**77,900**	**0**	**130,000**	**234,500**

Table T-15 describes the percentage reduction of suited timberlands as compared to the total lands identified as appropriate for timber production prior to adjustments for RCAs and landslide prone concerns. RCAs and landslide prone areas did not influence the area identified as suited timberlands for Alternative 5. Riparian area and landslide prone concerns associated with Alternative 5 are addressed by applying timber management practices that will not impair attainment of long-term goals for riparian or aquatic resources, nor increase the frequency of landslide events.

Table T-15. Percent of Suited Timberlands Reclassified as Not Appropriate for Timber Production Due to RCAs and Landslide Prone Areas by Alternative

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	21.0	20.3	21.7	87.9	0.0	19.0	21.5
Payette	16.9	14.7	16.5	100.0	0.0	14.6	14.6
Sawtooth	17.9	18.1	19.0	22.2	0.0	20.0	19.2
Ecogroup Totals	**19.3%**	**18.5%**	**19.7%**	**70.6%**	**0.0%**	**17.4%**	**19.0%**

<u>Long-term Sustained Yield Capacity (LTSYC)</u>

The long-term sustained yield capacity represents the highest uniform yield of wood that may be sustained under a specified management emphasis. The LTSYC also represents the volume of wood that may be produced while meeting all management requirements for protection of other resources. The following table (T-16) identifies the LTSYC for each Forest, and for the Ecogroup, for each alternative. The amounts shown are decadal volumes.

Table T-16. Long-term Sustained Yield Capacity in Millions of Cubic Feet

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	167.3	148.0	126.4	1.6	276.0	70.7	113.3
Payette	140.6	81.5	83.2	0.0	240.1	73.4	83.6
Sawtooth	48.0	32.8	35.5	4.6	95.2	7.8	23.7
Ecogroup Totals	**355.9**	**262.3**	**245.1**	**6.2**	**611.3**	**151.9**	**120.3**

Allowable Sale Quantity (ASQ)

The ASQ describes the maximum volume of timber that may be harvested from suited lands during a specified period, usually 10 years. The ASQ is different for each alternative because the area identified as suited timberland varies, as does management emphasis. The ASQ volume cannot be exceeded during a given decade, but the maximum volume allowed is not presented as a guaranteed harvest volume. The ASQ for a given alternative is dependent on the area identified as suited timberland, current inventory of timber on those lands, and the management actions associated with each alternative. The actual volume offered is the aggregate of individual project proposals, and is dependent on a number of factors including annual budgets, and organizational capabilities. The ASQ for each alternative is described in the following tables for the next five decades for each Forest (T-17 through T-19), and then summarized for the entire Ecogroup, Table T-20 and Figure T-2.

Table T-17. ASQ* for The Boise National Forest for the Next Five Decades by Alternative

Alternative	Decade 1		Decade 2		Decade 3		Decade 4		Decade 5	
	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet
1B	720.0	139.6	702.2	139.6	732.4	139.6	743.1	139.6	750.6	139.6
2	511.5	101.6	526.3	101.6	528.6	101.6	511.6	101.6	546.0	101.6
3	381.3	76.3	390.7	76.3	393.8	76.3	389.7	76.3	402.6	76.3
4	3.8	0.7	3.8	0.7	4.0	0.8	4.1	0.9	4.5	0.9
5	1,300.0	253.5	1,280.0	253.5	1,321.1	253.5	1,339.0	253.5	1,376.5	253.5
6	250.1	49.6	250.0	49.6	254.9	49.6	246.9	49.6	262.8	49.6
7	450.0	88.4	452.6	88.4	466.5	88.4	469.6	88.4	481.2	88.4

*ASQ is expressed in millions of board feet and millions of cubic feet.

Table T-18. ASQ* for The Payette National Forest for the Next Five Decades by Alternative

Alternative	Decade 1		Decade 2		Decade 3		Decade 4		Decade 5	
	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet
1B	600.0	117.4	583.4	117.4	592.7	117.4	629.1	117.4	626.5	117.4
2	193.0	38.0	193.0	38.0	195.6	38.3	275.0	53.0	276.5	56.7
3	238.2	47.1	241.3	47.1	246.4	47.7	291.6	57.4	296.2	58.7
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1,113.0	217.1	1,098.2	217.1	1,117.4	217.1	1,138.9	217.1	1,149.0	217.1
6	161.1	33.3	167.8	33.3	188.6	36.9	248.2	48.8	269.7	52.4
7	325.0	63.8	326.5	63.8	334.2	63.8	325.5	63.8	350.8	64.9

*ASQ is expressed in millions of board feet and millions of cubic feet.

Table T-19. ASQ* for The Sawtooth National Forest for the Next Five Decades by Alternative

Alternative	Decade 1		Decade 2		Decade 3		Decade 4		Decade 5	
	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet
1B	157.9	30.3	161.2	30.3	155.0	30.3	197.3	37.5	198.6	37.5
2	98.0	18.9	99.6	18.9	98.1	18.9	101.1	18.9	102.5	18.9
3	61.4	11.7	98.9	18.8	99.5	18.8	174.4	32.7	173.3	32.7
4	0.0	0.0	3.2	0.6	3.2	0.6	19.1	3.7	19.5	3.7
5	483.0	92.5	482.4	92.5	478.4	92.5	489.1	92.5	496.5	92.5
6	3.8	0.7	11.7	2.2	11.8	2.2	22.6	4.4	22.6	4.4
7	117.0	22.6	118.4	22.6	117.5	22.6	119.5	22.6	120.2	22.6

*ASQ is expressed in millions of board feet and millions of cubic feet.

Table T-20. ASQ* for The Ecogroup for the Next Five Decades by Alternative

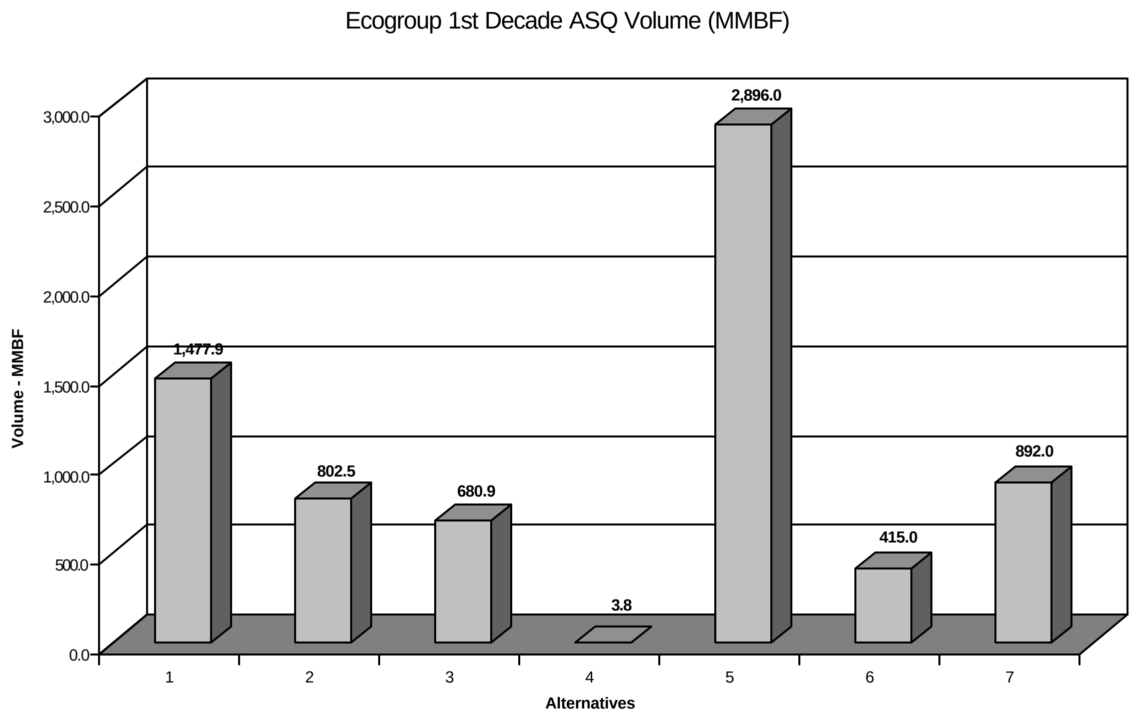
Alternative	Decade 1		Decade 2		Decade 3		Decade 4		Decade 5	
	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet	Board Feet	Cubic Feet
1B	1,477.9	1,446.8	1,480.1	1,569.5	1,575.7	1,477.9	1,446.8	1,480.1	1,569.5	1,575.7
2	802.5	818.9	822.3	887.7	925.0	802.5	818.9	822.3	887.7	925.0
3	680.9	730.9	739.7	855.7	872.1	680.9	730.9	739.7	855.7	872.1
4	3.8	7.0	7.2	23.2	24.0	3.8	7.0	7.2	23.2	24.0
5	2,896.0	2,860.6	2,916.9	2,967.0	3,022.0	2,896.0	2,860.6	2,916.9	2,967.0	3,022.0
6	415.0	429.5	455.3	517.7	555.1	415.0	429.5	455.3	517.7	555.1
7	892.0	897.5	918.2	914.6	5,362.2	892.0	897.5	918.2	952.2	5,362.2

*ASQ is expressed in millions of board feet and millions of cubic feet.

Management actions associated with each alternative reflect the allocation of management prescription categories (MPCs) to individual subwatersheds and other identified areas. As previously stated, MPCs define whether the area includes suited timberland. The MPC allocations also reflect management emphasis. Therefore, management actions associated with each alternative are based on the combination of MPCs. The MPCs are described in Chapter 2.

Timber harvest occurs in all alternatives but the amount and purpose varies by MPC. Timber harvest is prohibited in MPCs 1.1, and 1.2. In all other area timber harvest may occur but, where harvest activities occur on not suited timberlands (areas not allocated to MPCs 4.2, 5.1, 5.2, 6.1 and 6.2) the timber volume removed does not count toward accomplishment of ASQ. Timber removed from suited timberlands does contribute to ASQ volume. However, timber management on suited timberlands is balanced with or used to support attainment of other resource management goals and desired conditions. Timber management is emphasized only in areas allocated to MPC 5.2. Management emphasis associated with the mix of MPCs in each alternative influence both the volume, and the size of trees harvested. For example, an alternative that emphasizes maintenance and restoration of resource conditions will generally result in less timber harvest with small trees comprising a higher percentage of the volume as compared to an alternative with prescriptions that emphasize a high level of sustainable commodity and non-commodity outputs.

Figure T-2. ASQ Volume by Alternative for the Ecogroup in the First Decade



Data—including the allocation of lands to an MPC, identification of suited timberlands, current vegetation conditions from LANDSAT imagery, budget constraints, and identification of vegetation treatment activities—were provided for use in the SPECTRUM model. The SPECTRUM model calculated decade-by-decade outcomes, including changes in vegetation growth stage, acres treated by type of treatment activity, and timber harvest volumes. A complete description of the SPECTRUM model is found in Appendix B.

Effects of Alternative 1B - Alternative 1B represents the direction of the current forest plans as amended by the Pacfish and Infish environmental assessments, and as being implemented to comply with the biological opinions for Steelhead and Bull Trout. For the Boise and the Payette National Forests, ASQ volume has been modified from the current plans, reflecting that timberlands within RCAs and on landslide prone areas are no longer available for timber production. The ASQ volume described for the current Forest Plans was thus reduced by an estimated 15.3 percent on the Boise National

Forest and 20.6 percent on the Payette National Forest to arrive at the ASQ volume for Alternative 1B. On the Sawtooth National Forest, volume was calculated in the SPECTRUM model. Timberlands within RCAs and on landslide prone areas are treated the same on the Sawtooth National Forest as they are on the Boise and the Payette National Forests – they are not available for timber production. The following table describes the volume of timber by size class, and annual ASQ volume for the first decade.

Table T-21. Alternative 1B Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	0.4	71.6	72.0
Payette	0.1	59.9	60.0
Sawtooth	0.8	14.9	15.8
Total	1.3	146.4	147.8

Effects of Alternative 2 - Alternative 2 was designed to address "Need for Change" issues. ASQ volumes of 26.5 MMBF for the Boise National Forest, 21.7 MMBF for the Payette National Forest, and 4.3 MMBF for Sawtooth National Forest, were applied in the SPECTRUM model as a constraint or minimum volume to be achieved, provided other constraints could also be met. This volume represents the average amount purchased from the Ecogroup Forests during the period 1997 through 2001. This level of volume output will result in maintaining recent timber supply quantities coming from National Forest System lands, thus helping to maintain the current level of mill capacity. It will also assist in maintaining a viable timber industry, thus maintaining the availability of timber harvest as a tool to help achieve land and resource objectives. The model was designed to achieve at least 90 percent of the average volume purchase between 1997 and 2001 to identify the ASQ volume for this alternative. The following table displays the annual volume of timber by size class and total ASQ volume for the first decade.

Table T-22. Alternative 2 Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	3.3	47.9	51.2
Payette	0.3	19.0	19.3
Sawtooth	0.4	9.4	9.8
Total	4.0	76.3	80.3

Effects of Alternative 3 - Alternative 3 was designed to provide for the restoration of watershed and vegetation resources. The purpose of restoration is to maintain or enhance the resiliency of these resources thereby reducing risks associated with disturbance events. The ASQ volume established in the same way it was for Alternative 2. The model was designed to achieve at least 90 percent of the average volume purchase between 1997 and 2001 to identify the ASQ volume for this alternative. This volume objective was applied in the SPECTRUM model as a constraint provided other constraints could also be met. This level of volume output will result in maintaining recent timber supply quantities coming from National Forest System lands, thus helping to maintain the current level of mill capacity. It will also assist in maintaining a viable timber industry, thus maintaining the availability of timber harvest as a tool to help achieve land and resource objectives. The following table displays the annual ASQ volume, and volume of timber by size class for the first decade.

Table T-23. Alternative 3 Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	3.1	35.1	38.1
Payette	0.4	23.4	23.8
Sawtooth	0.1	6.0	6.1
Total	3.6	64.5	68.0

Effects of Alternative 4 - Alternative 4 was designed in a manner that provides for the development of vegetation largely through processes of plant growth, succession, and disturbance patterns due to insect activity, fire, and climate (e.g., wind, drought, snow, and ice). The objective for vegetation is for its development toward a desired condition that minimizes human disturbance while relying on natural processes. Relatively few acres were allocated to MPCs that include suited timberlands. Restoration and other management activities designed to move vegetation toward desired conditions provide the basis for determining the ASQ level for this alternative. Harvest activities and associated volumes were derived from the SPECTRUM model. The following table displays the annual ASQ volume, and volume of timber by size class for the first decade.

Table T-24. Alternative 4 Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	0.0	0.4	0.4
Payette	0.0	0.0	0.0
Sawtooth	0.0	0.0	0.0
Total	0.0	0.4	0.4

Effects of Alternative 5 - Alternative 5 was designed to provide a high level of sustainable goods and services, while also maintaining ecological functions. Alternative 5 also incorporates management requirements for protection of other resources. Allocation of lands to MPCs that include suited timberlands and a greater emphasis on management activities that allow timber harvest were used to derive estimated ASQ volume through the SPECTRUM model. The following table displays the annual ASQ volume, and volume of timber by size class for the first decade.

Table T-25. Alternative 5 Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	4.5	125.5	130.0
Payette	2.3	109.0	111.3
Sawtooth	0.3	48.0	48.3
Total	7.1	282.5	289.6

Effects of Alternative 6 - Alternative 6 was based on the theme of no further road construction in unroaded areas, generally 1,000 acres or larger in size, nor in inventoried roadless areas. MPCs allocated to these inventories roadless and unroaded areas do not include suited timberlands. The remaining lands, outside of inventoried roadless and unroaded areas, were allocated to MPCs similar to that found is Alternative 2. The following table displays the annual ASQ volume, and volume of timber by size class for the first decade.

Table T-26. Alternative 6 Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	2.5	22.6	25.1
Payette	0.8	15.3	16.1
Sawtooth	0.0	0.4	0.4
Total	3.3	38.3	41.6

Effects of Alternative 7 - Alternative 7 was based on the theme of no further road construction in inventoried roadless areas, restoration and maintenance of high-priority habitat and watershed conditions, hazard reduction, and production of a sustainable and predictable supply of goods and services. MPCs allocated to nearly all inventoried roadless areas do not include suited timberlands. Lands allocated to MPCs that allow for suited timberlands focus on economic production and restoration of the suited lands. The SPECTRUM model was designed to achieve 90 percent of potential volume production from these suited timberlands, while also reducing fire and insect hazard by a goal of 50 percent and achieving at least 90 percent of the desired vegetation conditions. The following table displays the annual ASQ volume, and volume of timber by size class for the first decade.

Table T-27. Alternative 7 Total Annual ASQ Volume and Volume by Size Class for the First Decade

Forest	First Decade Annual ASQ Volume, Millions of Board Feet		
	Small Trees (5.0 to 11.9 inch diameter)	Medium and Large Trees (12 inch diameter)	Total Volume
Boise	1.1	43.9	45.0
Payette	0.0	32.5	32.5
Sawtooth	0.0	11.7	11.7
Total	1.1	88.1	89.2

Total Sale Program Quantity (TSPQ)

TSPQ is the total volume of timber anticipated for harvest. This volume includes the harvest of timber that constitutes the ASQ (from suited timberlands), and additional timber volume resulting from vegetation management actions that take place as part of restoration activities or harvesting designed to contribute to the attainment of resource objectives and desired conditions. Timber harvested from unsuited timberlands is part of the TSPQ but is not accounted for as part of the ASQ. Therefore, volume contributing to TSPQ may come from both suited and not suited timberlands. In areas allocated to MPCs that allow mechanical treatment activities, the full range of management actions may be used on both suited and unsuited timberlands. TSPQ volume generally increases in those alternatives that are associated with greater emphasis on active restoration of vegetation.

TSPQ volume is summarized for each alternative in tables T-28 through T-31, and is graphically displayed for the Ecogroup in Figure T-3. The volume for each Forest is shown as the total TSPQ volume (ASQ plus additional volume) per decade for each of the next five decades.

Table T-28. TSPQ* for The Boise National Forest for the Next Five Decades by Alternative

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
1B	723.0	703.3	734.1	750.5	758.9
2	700.4	545.2	557.6	749.2	636.5
3	613.3	392.7	517.5	617.4	504.9
4	160.0	80.7	116.9	316.6	110.9
5	1,300.0	1,279.9	1,321.1	1,339.0	1,376.5
6	275.7	256.0	262.9	282.3	290.5
7	662.7	531.8	565.2	784.1	606.1

*TSPQ is expressed in millions of board feet.

Table T-29. TSPQ* for The Payette National Forest for the Next Five Decades by Alternative

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
1B	618.7	583.4	615.9	658.9	629.1
2	362.9	218.7	241.0	342.5	303.7
3	481.7	264.9	325.1	518.3	301.2
4	93.9	22.5	31.7	290.1	101.6
5	1,126.2	1,098.2	1,124.1	1,154.1	1,149.3
6	180.0	173.4	198.8	288.5	288.1
7	402.7	348.4	384.4	532.3	368.8

*TSPQ is expressed in millions of board feet.

Table T-30. TSPQ* for The Sawtooth National Forest for the Next Five Decades by Alternative

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
1B	164.3	161.4	155.8	216.4	203.3
2	180.8	100.1	112.9	166.0	105.9
3	183.2	135.2	137.8	268.3	197.0
4	44.6	19.9	29.9	68.8	37.2
5	505.0	482.6	479.5	509.8	198.8
6	10.9	13.0	13.9	40.2	40.8
7	294.3	118.4	115.5	205.5	138.0

* TSPQ is expressed in millions of board feet.

Table T-31. TSPQ* for The Ecogroup for the Next Five Decades by Alternative

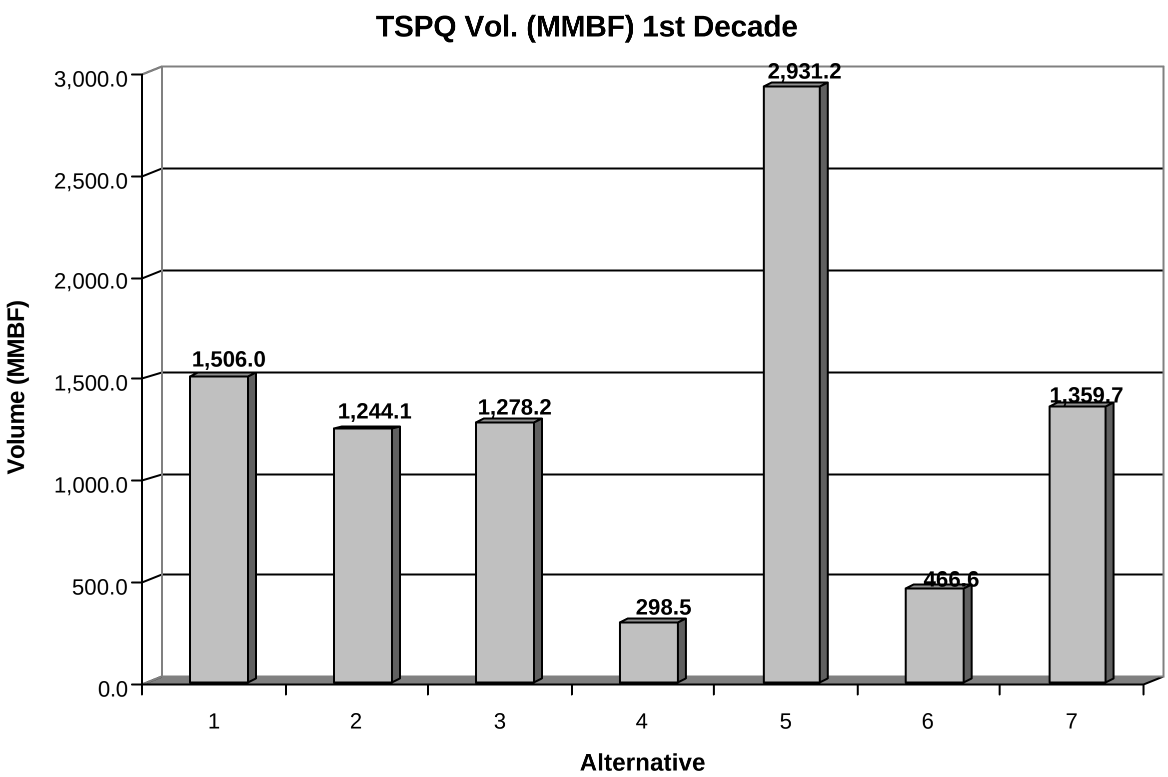
Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
1B	1,506.0	1,448.1	1,505.8	1,625.8	1,591.3
2	1,244.1	864.0	911.5	1,257.7	1,046.1
3	1,278.2	792.8	980.4	1,404.0	1,003.1
4	298.5	123.1	178.5	675.5	249.7
5	2,931.2	2,860.7	2,924.7	3,002.9	2,724.6
6	466.6	442.4	475.6	611.0	619.4
7	1,359.7	998.6	1,065.1	1,521.9	1,112.9

* TSPQ is expressed in millions of board feet.

Effects of Alternative 1B - TSPQ volume for Alternative 1B consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	0.2 million board feet per year
Payette National Forest	0.9 million board feet per year
Sawtooth National Forest	0.3 million board feet per year.

Figure T-3. TSPQ by Alternative for the Ecogroup



Effects of Alternative 2 - TSPQ volume for Alternative 2 consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	10.4 million board feet per year
Payette National Forest	9.8 million board feet per year
Sawtooth National Forest	4.2 million board feet per year.

Effects of Alternative 3 - TSPQ volume for Alternative 3 consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	11.7 million board feet per year
Payette National Forest	13.4 million board feet per year
Sawtooth National Forest	7.9 million board feet per year.

Effects of Alternative 4 - TSPQ volume for Alternative 4 consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	11.7 million board feet per year
Payette National Forest	5.8 million board feet per year
Sawtooth National Forest	3.1 million board feet per year.

Effects of Alternative 5 - TSPQ volume for Alternative 5 consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	none during the first 2 decades
Payette National Forest	0.7 million board feet per year
Sawtooth National Forest	1.1 million board feet per year.

Effects of Alternative 6 - TSPQ volume for Alternative 6 consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	1.6 million board feet per year
Payette National Forest	1.2 million board feet per year
Sawtooth National Forest	0.4 million board feet per year.

Effects of Alternative 7 - TSPQ volume for Alternative 6 consists of the ASQ volume and additional volume estimates. The additional volume estimated for each Forest during the first 2 decades is:

Boise National Forest:	14.6 million board feet per year
Payette National Forest	5.0 million board feet per year
Sawtooth National Forest	8.9 million board feet per year.

Cumulative Effects

Forested Land Identified as Tentatively Suited

Tentatively suited timberlands are determined from an assessment of National Forest System lands. The assessment identifies those lands that are not available and capable of being managed for timber production. This results in the identification of National Forest lands that do not and cannot support forest vegetation, lands that have been formally withdrawn from timber production, such as designated wilderness, forested lands where restocking of tree seedlings can not be assured within 5 years following timber harvest, and lands where timber production may result in irreversible resource damage to soils productivity, or watershed conditions. Of the items considered in this assessment the identification of National Forest System lands, and the lands formally withdrawn from timber production, are the only items that may have a cumulative affect on the identification of tentatively suited timberlands.

Changes in the area administered by the individual Ecogroup Forests will be the same for each alternative. The net change in area administered by each forest is expected to by relatively minor, resulting from relatively small increases or decreases due to land exchanges and acquisitions. Any change in area administered by the Ecogroup Forests would be expected to have only minor, non-significant changes in the area identified as tentatively suited. For example, the Ecogroup Forests realized a net increase of approximately 7,400 acres of tentatively suited timberlands due to land exchanges, from the time each Forest Plan was published up to October 1997. This represents an increase of less than **one-half** of 1 percent. This small Ecogroup-wide change in tentatively suited timberland, resulting from land exchanges, would also be true for each Forest individually.

Areas that have been formally withdrawn from timber production include designated wilderness areas, Research Natural Areas, and wild segments of Wild and Scenic Rivers. Forested lands in these withdrawn areas are not available for timber production and are thus classified as not suited. The Forest Plan EIS Record Of Decision does not result in the withdrawal of any areas from timber production but may recommend areas for formal designation. Formal withdrawal requires specific action on the part of Congress, the Secretary of Agriculture, or the Chief of the Forest Service. Decisions made by Congress, the Secretary, or the Chief may be different from the recommendations associated with the Record of Decision. The area recommended for wilderness designation for the entire Ecogroup is described below for each alternative. If Congress formally designates these areas as wilderness the area identified as tentatively suited timberlands would then be reduced by the amount of tentatively suited timberlands within the withdrawn areas. This is also described below for each alternative.

Effects of Alternatives 1B, 2, 3, 6, and 7

Area recommended for wilderness designation: 654,600 acres
Area of tentatively suited timberland in recommended wilderness: 248,900 acres

Effects of Alternative 4

Area recommended for wilderness designation: 2,526,900 acres
Area of tentatively suited timberland in recommended wilderness: 1,260,000 acres

Effects of Alternative 5

Area recommended for wilderness designation: None
Area of tentatively suited timberland in recommended wilderness: None

Acres of Tentatively Suited Lands Identified as Appropriate for Timber Management

Lands considered as being appropriate for timber management, also referred to as suited timberlands, are identified separately for each alternative. Decisions to be made in the Record of Decision will include the determination of how many acres are appropriate for timber management. This is a direct effect of the decision. This decision will not result in any cumulative effects.

Recreation

INTRODUCTION

The Sawtooth, Payette, and Boise National Forests are important recreation destination areas in the State of Idaho, as well as the nation. These Forests provide some of the most scenic landscapes in the Intermountain West. Recreation and related tourism are now some of the most important uses of these Forests. In 1997, recreation visits to these three Forests were estimated at more than five and half million visits. Established in 1972 by Congress, the Sawtooth National Recreation Area (SNRA) alone receives around 1,300,000 visits a year and offers "world class" recreation settings and opportunities. Congress has also designated four Wild and Scenic River segments as well as three Wilderness Areas within the Ecogroup area. All or portions of eight downhill ski areas, including the world renowned Sun Valley-Bald Mountain complex, are located within the Ecogroup and, together, provide more than 800,000 skier days of use. Owing largely to its outstanding recreation opportunities, the Sawtooth National Forest ranks within the top third of all National Forests in total recreation use.

National Forests provide a wide variety of settings for recreation experiences. Recreation settings vary from primitive—where there is little evidence of other people, more difficult access, and more opportunities for self-reliance—to more developed areas that offer more facilities, better access, and opportunities to interact with other recreationists. A classification system called the Recreation Opportunity Spectrum (ROS) is used to help describe different recreation settings and to help guide management activities. Recreation use is often measured in terms of Recreation Visitor Days (RVDs). One recreation visitor day represents one visitor spending 12 hours on the Forest engaged in recreation activities; or 12 visitors spending one hour; or any combination of time and visitors equaling one person for 12 hours. Developed recreation site capacity is usually measured in terms of Persons At One Time (PAOTs), which is simply the number of people that the site was designed to accommodate.

Related issues of wilderness and undeveloped recreation experiences are addressed in the *Wilderness* and *Inventoried Roadless Areas* sections of this chapter.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect recreation resources, experiences, and opportunities.

Background to Issue - During the public comment period, a large number of comments were received relative to recreation management and experiences on the three Ecogroup Forests. Some of these comments suggested:

- Due to increasing levels and new types of recreation use, a recreation alternative should be developed. Increased priority should be placed on recreation supply and management as well. More recreation facilities such as campgrounds and picnic areas should be developed in concert with local tourism efforts.

- More analysis needs to be included to disclose which recreation activities will be restricted and which roads will be closed as a result of adopted Forest Plan direction.

- Motorized travel should be more restricted, especially in environmentally sensitive areas and areas recommended for Wilderness designation.

- Motorized uses should have equal emphasis and attention as non-motorized. Increase motorized recreation planning; improve signing; provide more motorized recreation areas. Provide alternatives when closing trails and areas to motorized use to reduce conflicts.

- Improve winter recreation opportunities through expansion of downhill ski areas and the development of winter parking in specific areas across the Ecogroup area.

- Increase summer recreation opportunities through expansion of organization camps and recreation residences and development of new recreation facilities.

- Define acceptable impacts from dispersed/developed recreation in riparian areas. Close MPC 3.0 areas to ATVs. Protect wetlands and streams from motorized recreation use.

- Supplement budget allocations through partnership development and volunteerism to enhance maintenance and service capabilities.

- Improve recreational signing and increase environmental education opportunities.

Some of the comments have been addressed, to varying degrees, by new management direction in the revised Forest Plans. The increasing levels and types of use have been considered and addressed, as appropriate, in the management direction. User conflicts and travel management can only be addressed to a limited extent at the programmatic level. Revising Forest travel maps or defining and allocating use “zones” will be addressed in subsequent planning processes because they require site-specific analysis and more detailed resource information.

Recreation opportunities and experiences can be affected by management direction and activities associated with other resources in a variety of ways. At the programmatic analysis level, it is not possible to identify specific roads or facilities that will be decommissioned or relocated. Nor is it possible to precisely identify the areas in which recreation opportunities and experiences would be affected by other resource management such as vegetation restoration activities. However, in some cases, it may be possible to the use the combination of assigned management prescriptions (MPCs) and current resource conditions that would likely lead managers to take management actions that could potentially affect recreation opportunities and experiences.

Recreation settings can change as a result of management activities, especially those that construct new roads and facilities and visibly alter vegetation patterns. The Recreation Opportunity Spectrum (ROS) provides a framework for analyzing changes to recreation settings as a result of some management activities under each alternative. The ROS can be used to estimate changes to recreation settings and experiences resulting from development activities such as mechanical vegetation treatments, road construction and changes in motorized travel regulations. Some recreation settings would shift from less developed settings toward more developed settings as a result of either new development or from greatly increasing the standard of existing facilities. Settings could also shift in the opposite direction, toward more primitive, when motorized access becomes more restricted over large areas. The potential effects of all these management actions on recreation settings and experiences potential shifts are represented in the estimated ROS inventory shifts under each alternative.

As noted above, the ROS provides a framework for estimating the effects of some types of management activities. However, it does not reflect each alternative's potential for changed conditions due to fire use because the ROS is not affected by fire. This is largely because the effects of fire on the landscape do not constitute permanent development and are usually temporary or short-term in duration. Fire use activities are employed for vegetation restoration and fuels reduction and are frequently conducted during the spring and fall, depending upon a number of factors including vegetation type and condition. Fall prescribed fires and wildland fire use frequently results in conflicts with fall hunting activities. Fire use activities also result in landscapes with a burned appearance that some recreationists do not find attractive and may result in displacing recreation use to other locations. The relative potential for changed recreation settings and potential conflicts with fall hunting activities resulting from fire use treatments is best represented by comparing the levels of acres of high or extreme uncharacteristic wildfire hazard and high or extreme resistance to control that are assigned to MPCs 5.1 or 6.1 under each alternative.

Management direction for soil, water, riparian, aquatic, and wildlife resources can potentially result in a variety of effects to existing recreation facilities, opportunities, and potential development. Recreation facilities and activities can cause impacts, such as sedimentation and wildlife disturbance, that may need to be mitigated or eliminated. Potential mitigation ranges from facility modifications and seasonal restrictions to facility decommissioning and removal. Some of these mitigations may be mandatory, arising from compliance with the Endangered Species Act, and some would depend on a combination of management emphasis and watershed priority. Although potential mitigation impacts to developed recreation facilities may occur at any location, facilities within subwatersheds identified as high priorities for active restoration, with an assigned MPC of 3.2 are the most likely to be affected. In the case of dispersed recreation, areas where recreation opportunities and experiences are most likely to be affected by soil, water, riparian, aquatic, and wildlife management direction are high priority restoration subwatersheds assigned to MPCs 3.1 or 3.2. Under these MPCs, restoring or maintaining resource conditions would receive a high priority and could potentially result in dispersed use restrictions and/or closures to achieve or maintain desired resource conditions. Criteria used for determining restoration priorities are described in the *Soil, Water, Riparian, and Aquatic Resources* section of this chapter.

One of the major roles of the transportation network on National Forests is to provide access for recreational use of the Forests. Recreation opportunities are greatly influenced by the type and levels of recreation access. As a result, changes to the transportation network can also have substantial effects on recreation opportunities and experiences. New roads frequently expand access options in areas where access was previously much more limited. Road closures and decommissioning generally result in reducing the types of access that are possible or allowed. As noted above, it is not possible to identify specific roads or facilities that will be relocated or decommissioned in this programmatic analysis. However, it is possible to determine the relative potential for new construction and decommissioning based on management direction fostered by the MPC assignments for each alternative. The overall relative size of the National Forest System road network and levels of unclassified road decommissioning under each alternative can be estimated, compared, and used to predict potential access changes under each alternative.

Indicators - The following indicators are used to measure the effects of management activities on recreation resources, experiences, and opportunities on the three Forests by alternative. The sources used to develop this data are programmatic estimations, such as the results of modeling or MPC assignments, and are only meant to be relative comparisons. Actual results would depend on conditions and analyses done at the site-specific level and may be different than those predicted here. The data used by these analyses serves to show relative differences between the alternatives, rather than to represent the actual acres or percentages of treatments that are expected to occur. Treatment areas would not equal MPC acres, but would be a much smaller subset based on management priorities, funding opportunities, and project-level decisions within the planning period.

- *Indicator 1 - Estimated changes in acres of each ROS class from current inventory*. This indicator reflects changes to current recreation settings and experiences due to anticipated developments and management actions associated with each alternative. It will reflect the relative balance between developed and undeveloped recreation settings that can be anticipated under each alternative. It will also measure, to some extent, each alternative's response to providing semi-primitive motorized experiences, a declining opportunity identified in the Idaho State Comprehensive Outdoor Recreation and Tourism Assessment and Policy Plan (SCORTP).

- *Indicator 2 - Acres having high or extreme ratings for either uncharacteristic wildfire hazard or resistance to control that are assigned a 5.1 or 6.1 MPC*. This indicator is used to represent the likelihood of changed recreation opportunities and experiences due to potential treatments for the purpose of uncharacteristic wildfire hazard and fuel reduction.

- *Indicator 3 - Number of developed recreation sites located within high priority subwatersheds assigned to MPC 3.2*. This indicator is used to represent the relative differences between alternatives in the magnitude of potential impacts to developed recreation facilities due to watershed, riparian, and aquatic mitigation and restoration activities.

- *Indicator 4 - Total acres of MPCs 3.1 and 3.2 within high priority restoration subwatersheds*. This indicator is used to assess relative differences, between alternatives, in the potential for changes to dispersed recreation opportunities and experiences as a result of aquatic restoration activities.

- *<u>Indicator 5 - Projected total miles of Forest Classified Roads in 2015</u>*. This indicator is used to assess how overall Forest access, by classified roads, may vary by alternative through the next planning period.

- *<u>Indicator 6 - Projected miles of unclassified roads decommissioned by 2015</u>*. This indicator is used to assess relative differences, between alternatives, in the magnitude of potential impacts to recreational access on unclassified roads through the next planning period under each alternative.

For the cumulative effects analysis, the above indicators are again used to display potential effects on an Ecogroup area scale.

Affected Area

The affected areas for direct and indirect effects to recreation resources are the lands administered by the three National Forests in the Ecogroup. This area represents National Forest System lands where recreation resources exist, and the lands where those resources could receive impacts from both management activities and natural events. The affected area for cumulative effects includes the lands administered by the three National Forests as well as lands of other ownership, both public and private, that provide non-urban recreation opportunities within the southwestern Idaho area. Cumulative effects to recreation resources on other land ownerships are addressed to lend a broader perspective to the importance of recreation resources on the Forests, and to emphasize cooperation among all local providers of recreation resources.

CURRENT CONDITIONS

General Recreation

Since the original Forest Plans were written and adopted, a number of forces and influences have occurred that, in combination, played a strong role in characterizing recreation management on the Ecogroup Forests. Some of these include:

- Recreation use has increased at rates considerably more than those predicted in the Forest Plans, due largely to a combination of increasing local populations and income levels;

- Rapid growth in relatively new recreation uses and improvements in technology have occurred;

- Recent listings of fish and wildlife species under the Endangered Species Act have occurred in areas that are also popular or high-use recreation areas;

- Recreation budgets have mostly been “flat” or in some cases, declining. At their best, Forest recreation budgets were still well below the level needed to fully implement the Plans; and

- Agency workforce management actions have resulted in staff reductions on all three Forests.

The implications of these forces has been manifested in a number of ways:

- Some recreation uses are expanding into previously unused areas, changing recreation settings and creating conflicts with other recreationists. Conflicts between recreation and non-recreation users of the Forests are increasing;

- Sensitivity to recreation impacts on other resources is increasing, necessitating increasing levels of management control and restrictions;

- The ability of Ecogroup Forests to respond purely to recreation demand and maintenance needs has been limited. Capital investment and heavy maintenance priorities have, in large part, shifted toward Endangered Species Act compliance situations;

- Maintenance backlogs have increased;

- Operation of many developed recreation facilities has shifted from the Forest Service to private sector companies under concession permits. There is a greater reliance upon partnerships and volunteerism to manage recreation resources; and

- In some cases, cost recovery programs, such as the Fee Demo program, are being used to bridge maintenance fund gaps.

Developed Recreation

Developed recreation facilities include a variety of distinctly defined areas, such as campgrounds and downhill ski areas, where facilities have been developed either by the Forest Service or by private parties for concentrated public use. Privately developed facilities are approved by the Forest Service and are permitted under special use authorizations issued by the Forest Service. They are usually in rural or roaded natural settings. Table RE-1 displays the type, number, and capacity of developed facilities within the Ecogroup area.

Campground and picnic area use is very popular, especially in the SNRA. Although the Forests have upgraded a number of facilities, outdated facilities with heavy maintenance needs are common. Many parking spurs are too short for modern recreational vehicles and trailers, and doorways to toilets are too narrow for wheelchairs. Unfortunately, any need for additional facilities is overshadowed by a shortfall in maintenance and rehabilitation funds for existing facilities. As funds become available, the trend has been to devote resources to upgrading large campgrounds that receive high levels of use, and to mitigating resource impacts of developed recreation facilities.

In addition to the facilities included in the above table, a number of developed cross-country skiing facilities can be found in numerous locations, largely on the Boise and Sawtooth National Forests. These facilities include trailheads, restrooms, groomed ski trails, and yurt accommodations. Some of these facilities are provided through a partnership with the Idaho Department of Parks and Recreation, while others are privately owned and operated under special use authorizations.

Table RE-1. Type, Number, and Capacity of Developed Recreation Facilities in the Ecogroup Area

Type of Facility	Boise NF		Payette NF		Sawtooth NF	
	No. of Sites	PAOTs*	No. of Sites	PAOTs*	No. of Sites	PAOTs*
Publicly Developed Facilities						
Campgrounds	83	5,593	37	2,219	70	7,158
Picnic Areas/Day Use Sites	6	375	4	185	15	1,057
Interpretive/Information Sites	3	187	9	105	8	520
Boating/Fishing Access Sites	18	1,661	6	205	5	477
Swimming Areas	1	56	0	0	3	221
Trailheads/Transfer Stations	78	2,433	38	1,504	34	2,255
Scenic Overlooks	0	0	1	12	4	126
Cabin Rentals	15	93	2	12	0	0
Snowparks	3	175	0	0	2	185
Subtotal	207	10,573	97	4,242	141	11,999
Privately Developed Facilities						
Ski Areas	1	4,400	2	2,850	5	12,250
Recreation Residences	118	590	1	5	181	905
Lodges/Resorts/Concessions (Operated under Special Use Authorization)	5	550	1	24	4	715
Organization Camps	4	600	0	0	12	1,475
Subtotal	128	6,140	4	2,879	202	15,345
Totals	**335**	**16,713**	**101**	**7,121**	**343**	**24,637**

*PAOT's = Recreation capacity measure meaning Persons At One Time.

Dispersed Recreation

The three Forests also provide many opportunities for dispersed recreation (Table RE-2). Dispersed recreation occurs on areas of the three Forests outside of developed sites. Popular forms of dispersed activities include hunting, fishing, all terrain vehicle (ATV) riding, river floating, snowmobiling, mountain biking, hiking, sightseeing, backcountry skiing, and camping.

River recreation opportunities within the Ecogroup Forests are especially important. The Salmon, Payette, and Boise River systems provide outstanding whitewater, wilderness, and scenic floating experiences. Due to its popularity and importance on a national scale, use of portions of the Salmon River system is regulated through a permit system. Use of portions of the Salmon River system is also seasonally restricted in an effort to protect threatened and endangered fish species and their habitat. Commercial outfitting and guiding plays a large role in providing river recreation experiences, especially in the Salmon and Payette River systems. Mountain biking is a growing trail use, with numerous trails identified throughout the Ecogroup that offer outstanding riding experiences. Both on- and off-trail use of ATVs has increased dramatically across the Ecogroup, especially on the Mountain Home and Minidoka Ranger

Districts. Interest in recreational dredging for gold is increasing in some locations such as the Idaho City Ranger District. However, potential adverse effects on threatened and endangered fish species have resulted in a combination of seasonal restrictions and complete closures in selected stream sections.

Table RE-2. Dispersed Recreation Elements on the Ecogroup

Dispersed Recreation Element	Boise NF	Payette NF	Sawtooth NF
Miles of motorized **summer** trails	881	622	1,088
Miles of non-Motorized **summer** trails	218	1,153	899
Miles of groomed snowmobile trails	771	237	233
Miles of groomed cross-country ski trails	34	0	80
Acres closed to **summer** motorized vehicle uses*	1,679,000	1,790,000	1,324,000
Acres open to **summer** motorized vehicle uses*	524,000	509,000	787,000
Acres closed to **winter** motorized vehicle uses*	351,000	1,223,000	585,000
Acres open to **winter** motorized vehicle uses*	1,851,000	1,076,000	1,526,000
Number of outfitter and guide permits	15	18	41
Significant caves	0	10	0

*Includes both on- and off-trail uses and all forms of motorized and non-motorized mechanized use during all or any part of the year. Forest totals may differ slightly due to rounding.

River recreation opportunities within the Ecogroup Forests are especially important. The Salmon, Payette, and Boise River systems provide outstanding whitewater, wilderness, and scenic floating experiences. Due to its popularity and importance on a national scale, use of portions of the Salmon River system is regulated through a permit system, and is seasonally restricted in an effort to protect listed fish species and their habitat. Commercial outfitting and guiding plays a large role in providing river recreation experiences, especially in the Salmon and Payette River systems. Mountain biking is a growing trail use, with numerous trails identified throughout the Ecogroup area that offer outstanding riding experiences. Both on- and off-trail use of ATVs has increased dramatically across the Ecogroup area, especially on the Mountain Home and Minidoka Ranger Districts. Interest in recreational dredging for gold is increasing in some locations such as the Idaho City Ranger District. However, potential adverse effects on listed fish species have resulted in a combination of seasonal restrictions and complete closures in selected stream sections.

In general, winter recreation use also continues to increase across the Ecogroup Forests. Both snowmobiling and cross-country skiing have shown dramatic increases in localized parts of the Ecogroup area. With their relatively high elevations, some areas within the Ecogroup represent the only early season opportunities for snowmobiling and skiing, making the area important on a statewide basis and creating terrain conflicts among user groups. All forms of skiing, downhill, backcountry, heliskiing, and cross-country track skiing, are available within the Ecogroup area. Galena Lodge and an extensive system of groomed cross-country ski trails in the upper reaches of the Wood River valley provide outstanding track skiing experiences, and are managed under a special-use authorization with the Blaine County Recreation Board.

Interest and participation in heritage tourism is increasing through Forest Service programs such as Passport In Time. Important historic properties within the Ecogroup area, including prehistoric and Chinese mining sites, contribute to this growing popularity.

The Idaho State Comprehensive Outdoor Recreation and Tourism Assessment and Policy Plan (SCORTP 1998) observes:

> *"Generally, semi-primitive motorized recreation is in shortest supply. The demand for trails in populated areas already exceeds supply. ... There are few opportunities specifically designed for four-wheelers and ATVs in Idaho. ... Land management agencies need to provide more designated four-wheel drive and ATV routes."*

The State of Idaho Parks and Recreation Department provides equipment and funding to county governments to groom a number of snowmobiling and cross-country skiing trails under a growing and very popular co-operative program. This program combines yurt accommodations with groomed trails to provide overnight winter camping opportunities.

Dispersed recreation management presents some of the greatest challenges currently facing recreation managers as they attempt to manage increasing levels and types of recreation use. Current data indicate that resource impacts from dispersed use are also increasing. During the period of 1997 to 1998, a recreation task group on the Boise National Forest conducted a dispersed site condition inventory of known dispersed recreation sites on the Forest (USDA Forest Service 1998). Data gathered from Boise dispersed sites during this inventory included the following:

- The "average" dispersed recreation site has 1,751 square feet of devegetated, barren soil area;
- 90 percent of the sites are located within 300 feet of water, putting many of them typically within sensitive Riparian Conservation Areas;
- 83 percent of the trees within the barren core area exhibit some form of damage from use;
- 26 percent have potential for flooding without extreme water level changes;
- 82 percent have potential for snowmelt erosion from the site;
- 54 percent have potential for trail erosion from the site;
- 10 percent have potential of being historically significant;
- 70 percent have litter larger than a pop-top;
- 61 percent have evidence of human waste; and
- The number of dispersed sites was increasing as much as 9 percent per year in popular locations.

Although recreation managers have been working to address resource impacts from developed sites, this information points to a growing need to focus recreation management and resources on dispersed sites and activities.

Tourism

Locally, much of the tourism industry is associated with downhill skiing, guided river float trips, guided hunting and fishing trips, and sightseeing excursions to the SNRA. Natural resource values associated with these activities are vital to the local tourism industry. As such, future management of the Boise, Payette, and Sawtooth National Forests will continue to play an important role for the tourism industry in the region. The tourism industry depends upon a mix of highly developed, easily accessed facilities, as well as remote or semi-primitive experiences within natural settings. The opportunities to view highly scenic landscapes and wildlife, as well as opportunities for exciting recreation experiences, attract quite a number of people to the Ecogroup. Although no current figures are available for the Ecogroup Forests, yearly recreation visits in 1997 to the three Forests were estimated to be almost 5,653,000. According to a tourism study commissioned by the Idaho Department of Commerce, travel-generated spending in the three state planning regions that encompass the Ecogroup was almost $895,000,000 in 1997 (Idaho Department of Commerce 1999). The recreation resources of the Ecogroup Forests are likely responsible for a major portion of this spending.

The Ecogroup Forests also contain all or portions of six state-designated Scenic Byways. Three Scenic Byways on the Sawtooth converge in Stanley, Idaho, and are designated as the Sawtooth, Ponderosa and Salmon River Scenic Byways. A large part of the Ponderosa Scenic Byway also crosses the Boise National Forest. The Payette River Scenic Byway crosses portions of both the Boise and Payette National Forest. The Hells Canyon and Wildlife Canyon Scenic Byways cross portions of the Payette and Boise National Forests, respectively. These six Scenic Byways comprise an estimated 576 miles in total length, and serve as an indicator of the highly attractive scenic features found on the Ecogroup Forests.

Recreation Setting

The Forest landscapes offer recreation settings that are managed to provide opportunities for a variety of recreation experiences. The settings provide the physical, social, and managerial environments needed to produce recreation opportunities and experiences. Recreationists choose a setting and activity to create a desired experience. Facilities such as campgrounds and trails are supplied to assist users of the setting and to support activities. Settings, activities, and facilities are managed to maintain the conditions necessary to produce the expected experiences.

The various setting components provide the basic elements in determining ROS classes. The ROS system describes different classes of outdoor environments, activities and experience opportunities. The principal classes that relate to Ecogroup settings include Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Roaded Modified and Rural. A seventh ROS class, Urban, is not present within the Ecogroup. Table RE-3 describes the recreation setting for each ROS class. Table RE-4 displays the current estimated acres within each ROS class on each Forest for both summer and winter periods. Table RE-5 shows the estimated amounts of different types of recreation use across the Ecogroup Forests in 1997. The recreation use estimates displayed in Table RE-5 are Forest Service estimates. In some cases, estimates compiled by the Idaho Department of Parks and Recreation are much higher. Recreation specialists have mapped both the current ROS inventory and the ROS strategy for recreation management as part of the Forest Plan revision effort. These maps will be used to guide management under the revised Plans and are available upon request.

Table RE-3. ROS Class Setting Descriptions

ROS Class	Description of Recreation Opportunity Setting
Primitive (P)	Very high probability of solitude, closeness to nature, challenge and risk; essentially unmodified natural environment; minimal evidence of others; few restrictions evident; non-motorized access and travel on trails or cross country; no vegetation alterations.
Semi-Primitive Non-Motorized (SPNM)	High probability of solitude, closeness to nature, challenge and risk; natural appearing environment; some evidence of others; minimum of subtle, on-site controls; non-motorized access and travel on trails, some primitive roads or cross-country; vegetation alterations to enhance forest health - few and widely dispersed.
Semi-primitive Motorized (SPM)	Moderate probability of solitude, closeness to nature, high degree of challenge and risk using motorized equipment; predominantly natural appearing environment; few users but evidence on trails; minimum of subtle, on-site controls; vegetation alterations few, widely dispersed, and visually subordinate.
Roaded Natural (RN)	Opportunity to be with other users in developed sites, little challenge or risk; predominantly natural appearing environment as viewed from sensitive roads and trails with moderate evidence of human sights and sounds; moderate concentration of users at campsites; some obvious user control; access and travel is standard motorized vehicles; resource modification and utilization practices are evident but harmonize with the natural environment.
Roaded Modified (RM)	Opportunity to get away from other users, easy access, little challenge or risk; substantially modified environment (roads, timber harvest units, slash, etc.); little evidence of other users except on roads; little regulation of users except on roads; standard motorized use; vegetation alteration to enhance recreation setting.
Rural (R)	Opportunity to be with others is important as is facility convenience, little challenge or risk except for activities like downhill skiing; natural envi ronment is culturally modified; high interaction among users; obvious on-site controls; access and travel facilities are for intensified motorized use.
Urban (U)	Opportunity to be with others is very important as is facility and experience convenience, challenge and risk are unimportant except for competitive sports; urbanized environment that may have a natural appearing backdrop; high interaction among large number of users; intensive on-site controls; access and travel facilities are highly intense motorized use often with mass transit supplements; vegetation is planted and maintained.

Table RE-4. Estimated Acres of Current ROS Classifications*

Season	ROS Class	Boise NF	Payette NF	Sawtooth NF
Summer	Primitive	0	768,000	227,000
	Semi-primitive Non-motorized	487,000	458,000	368,000
	Semi-primitive Motorized	392,000	415,000	741,000
	Roaded Natural	404,000	263,000	293,000
	Roaded Modified	915,000	395,000	482,000
	Rural	5,000	0	0
	Urban	0	0	0
Winter	Primitive	0	775,000	280,000
	Semi-primitive Non-motorized	206,000	440,000	56,000
	Semi-primitive Motorized	1,725,000	745,000	1,700,000
	Roaded Natural	167,000	39,000	73,000
	Roaded Modified	100,000	301,000	2,000
	Rural	5,000	0	0
	Urban	0	0	0

* Figures were rounded to the nearest 1,000 acres. Forest totals may differ slightly due to rounding.

Table RE-5. Estimated 1997 Ecogroup Use for Major Recreation Activities

Type of Use	Boise NF		Payette NF		Sawtooth NF	
	RVDs	Percent of Total Use	RVDs	Percent of Total Use	RVDs	Percent of Total Use
Camping (all types)	620,000	35	211,000	16	1,037,000	50
Picnicking	18,000	1	29,000	2	17,000	1
Downhill skiing	209,000	12	38,000	3	224,000	11
X-Country skiing/snow-shoeing	36,000	2	3,000	0.2	28,000	1
Automobile travel	182,000	10	171,000	13	69,000	3
Hunting (all types)	112,000	6	73,000	6	54,000	3
ATV and motorcycle use	37,000	2	52,000	4	30,000	1
Mountain/Tour bike use	53,000	3	10,000	1	36,000	2
Sightseeing activities	16,000	1	113,000	9	51,000	2
Power boating/other watercraft	62,000	3	28,000	2	7,000	0.3
Hiking and walking	57,000	3	62,000	5	63,000	3
Horseback riding	24,000	1	65,000	5	20,000	1
Fishing (all types)	117,000	7	123,000	10	39,000	2
Recreation cabin use	13,000	1	0	0	40,000	2
Snowmobiling	28,000	2	13,000	1	33,000	2
Gathering forest products	63,000	4	57,000	4	22,000	1
All other recreation uses	128,000	7	244,000	19	301,000	15

Recreation Uses

Recreation use varies in type and amount across the Ecogroup area. The last year that recreation use on the three Forests was estimated in terms of Recreation Visitor Days (RVDs) was 1997. Estimated use levels for the major uses are shown in Table RE-5, above.

In 2000, the Forest Service initiated the National Visitor Use Monitoring Project to provide estimates of recreational use on National Forests and gather other important data regarding recreation customer demographic statistics and satisfaction levels. Under this project, initial visitor use surveys were conducted on the Boise and Sawtooth Forests during the summer of 2000. The Payette conducted its initial round of surveys during 2002. Units of measurement differ from previously used units of measurement and, in some cases, Forest use boundaries were also different. Since the methodology and measurement units are different from previous use estimates, results of the survey cannot be integrated with past estimates for trend analysis purposes. The survey results indicate that in 2000, the Boise National Forest received 1,079,800 recreational visits +/- 13.1 percent while the Sawtooth National Forest received 842,151 visits +/- 9.2 percent. The survey results for the 2002 Payette survey have not been completed and are not available at this time.

Camping is still the primary developed recreation activity during summer and accounts for an estimated 36 percent of all recreation use. Observations from recreation staff on the Ecogroup Forests indicate that a number of these uses have been growing at a very rapid rate since 1997. These uses include snowmobiling, ATV use, archery hunting, mountain biking, and year-round yurt camping. Although both motorized and non-motorized recreation use are increasing, motorized use seems to be increasing more rapidly.

Trends in recreation use and tourism indicate continued growth in the past few years. Much of this might be attributable to a combination of rising local populations and per capita income levels. In some areas of the Ecogroup, increasing population age has probably also contributed to the rising recreation use levels.

Recreation Conflicts

Forest recreation managers have observed increasing levels of conflict associated with recreation activities and facilities. Some of these include:

- Terrain use conflicts between snowmobilers and skiers;
- Impacts from livestock grazing on recreation experiences;
- Impacts from float boating on threatened and endangered fish species and their habitat;
- Conflicts associated with the balance of river use between commercial float boat use and permitted use by non-commercial boaters;
- Impacts from developed recreation facilities on threatened and endangered fish species and their habitat;

- Increasing impacts to soil and vegetation resources from dispersed camping and vehicle use;

- Impacts from ATV use on non-motorized recreation experiences, vegetation, and water quality; and

- Disturbance to wintering wildlife from snowmobiles and winter recreationists.

Recreation Demand

Overall, the demand for both developed and dispersed recreation is expected to continue to increase in future years due to rising populations. The 1997 estimates of dispersed vs. developed recreation use are displayed in Table RE-6. Projections of recreation use levels for 2005, 2010, 2015, and 2020 are displayed in Table RE-7. Projections for 2020 recreation use levels represent an average growth of 2.0 percent per year for recreation use on the three Forests.

Table RE-6. Estimated Recreation Use for Fiscal Year 1997 in RVDs

Recreation Use	Boise NF	Payette NF	Sawtooth NF
Developed Recreation Use	641,000	322,000	1,036,000
Dispersed Recreation Use	1,139,000	967,000	1,036,000
Total Recreation Use	1,780,000	1,289,000	2,072,000

Table RE-7. Projected Total Recreation Use in RVDs

Year	Boise NF		Payette NF		Sawtooth NF	
	Developed	Dispersed	Developed	Dispersed	Developed	Dispersed
2005	761,000	1,302,000	380,000	1,139,000	1,197,000	1,197,000
2010	828,000	1,471,000	412,000	1,235,000	1,292,000	1,292,000
2015	894,000	1,589,000	443,000	1,330,000	1,387,000	1,387,000
2020	953,000	1,694,000	472,000	1,415,000	1,474,000	1,474,000

Recreation Supply

Overall recreation supply is described in terms of "practical maximum capacity". Practical maximum capacity is defined as the level of use that would not degrade the physical capabilities and natural resources of a site. Studies indicate that when use levels are consistently above 40 percent of the theoretical capacity in developed sites, long-term resource damage is likely to occur. The Forests' developed and dispersed recreation practical maximum capacities are displayed in Table RE-8.

Table RE-8. Estimated Practical Maximum Capacity in RVDs

Reasonable Capacity	Boise NF	Payette NF	Sawtooth NF
Developed Practical Maximum Capacity	2,676,000	527,000	4,114,000
Dispersed Practical Maximum Capacity	8,333,000	3,556,000	5,861,000

All three Forests are estimated to be capable of meeting developed and dispersed recreation demand for the next planning period. However, these figures reflect overall demand that allows over-supply of one type of recreation use to compensate for under-supply of other uses. Forest Service recreation managers have observed that demand for developed camping and picnic sites in popular recreation areas and travel corridors is currently at or above capacity during peak summer weekends and summer holidays. At the same time, other recreation facilities are much less than full during the same periods or prior to Memorial Day and after Labor Day. Although dispersed supply may also technically exceed demand, competition for the same terrain, such as that between snowmobilers and cross-country skiers, is increasing. Dispersed campers are also likely to face heavy competition for favored camping spots during peak summer weekends and holidays. The supply and demand analysis indicates that there should be adequate general supply for the planning period except during peak summer weekends and holidays.

Recreation Strategy

As noted above, recreation resource management within the Ecogroup is characterized by ever-rising recreation demand, increasing awareness of recreation activity impacts, and increasing levels and types of conflict combined with funding levels that simply cannot keep pace. As a result, the Ecogroup Forests are also experiencing decreasing ability to maintain recreation resources and manage conflicts. A strategy to address these apparent challenges is embodied in a number of ways.

The National Recreation Agenda provides national direction that can be focused on local recreation situations and needs. It is also reflected to some extent in the Management Area direction in the revised Forest Plans where Districts are responding to specific demands or uses while factoring in the physical capabilities and characteristics of the area. The strategy is also reflected in the Capital Improvement Program that each Forest has developed.

Specific strategies to address increasing recreation use include:

- Address resource impacts as they occur or are identified.
- Restrict uses to hardened sites in cases where appropriate.
- Increase limitations on dispersed camping and development where and when appropriate.
- The Ecogroup Forests are nearly unique in their concentration of TEPC species and recreation features such as the SNRA. It is recognized that the value of recovery of TEPC species, especially fish, is a benefit to recreation.
- From user contacts, the Payette understands that most users are looking for dispersed recreation experiences rather than developed experiences. This is reflected in their recreation program and planning.

- The Idaho SCORTP provides some general senses of recreation in the state as a whole but is not at a scale that leads directly to a Forest strategy. Resource impacts associated with recreation were not a factor in developing the SCORTP. The Ecogroup Forests cannot supply the recreation need if it degrades, or is beyond the capabilities of, other resources.
- Use the Recreation Opportunity Spectrum to plan for desired recreation settings and experiences and to meet customer expectations.

Sawtooth National Recreation Area

The SNRA was established under Public Law 92-400 in 1972 to preserve and protect the area's primary values of natural beauty, fish and wildlife resources, pastoral and historical values, and enhance recreation opportunities associated therewith. The legislation allows for consumptive resources uses, such as grazing, timber harvest, and mineral extraction, as long as the primary values are not impaired.

Outstanding scenic landscapes and recreation opportunities make the SNRA an international destination recreation attraction. Recreation opportunities range from primitive wilderness experiences to highly developed campground and resort experiences. Camping and sightseeing are the primary summer activities, while cross-country and backcountry skiing, and snowmobiling are the primary winter activities. Dispersed motorized uses have been allowed with relatively few controls. Recently, snowmobile and cross-country ski conflicts in the southern portion of the SNRA along the State Highway 75 corridor were addressed through the use of a local task force comprised of members of both user groups.

Developed recreation areas are located largely adjacent to the lakes located along the edges of the Sawtooth range, along the Big Wood River, and in the Salmon River Canyon. Redfish Lake is the most highly used area on the SNRA. The SNRA provides a complex mix of developed recreation facilities that include 37 campgrounds, 10 picnic sites, 5 boating facilities, 3 scenic overlooks, 3 swimming sites, 21 trailheads, 8 information and interpretive sites, 4 resorts, 1 cross-country ski area and day lodge, 8 organization camps, and 7 summer residence tracts.

As a nationally designated recreation area, the SNRA is to be managed as a "showcase" for recreation opportunities. Many renovations and upgrades of developed recreation facilities have been completed within the SNRA in an attempt to meet visitor expectations. However, efforts to meet "showcase" standards have fallen short due to significantly reduced budgets. Users fees were recently instituted under the "Fee Demo" program in an effort to address the budget shortfall and maintenance needs.

Recreation Budget Needs

Since the original Forest Plans were developed, recreation budget allocations have fluctuated to some extent but most often have been well below the levels needed to fully implement the Plans. At the same time, costs have continued to escalate, requiring greater funds to accomplish the same level of work and service. As a result, services, new development, and maintenance of existing facilities have generally been below the levels stated in the Forest Plans, creating a gap between Forest Service recreation accomplishments and public expectations. Insufficient budgets and increasing costs have added to the backlog of needed maintenance. Developed facility maintenance backlogs for each Forest have been estimated and are displayed in Table RE-9. Backlog estimates for trail maintenance are still currently being developed.

Table RE-9. Estimated Developed Recreation Facility Maintenance Backlog

	Boise NF	Payette NF	Sawtooth NF
Estimated Developed Facility Maintenance Backlog	$1,949,000	$405,000	$5,746,000

* Estimates rounded to the nearest $1,000.

With expected increases in use across all alternatives, recreation budget needs would also expand under every alternative to meet the rising demand for recreation facilities, services, and opportunities. Given that none of the alternatives represents a recreation-emphasis alternative, and also the fact that overall recreation use would be largely the same under each of the alternatives, sources of differences between alternatives in recreation program budget needs would likely be subtler. Current estimates for total needs of the recreation programs for each of the Ecogroup Forests appear in Table RE-10. These costs include overhead assessments and other indirect costs that must also be covered by recreation program budgets.

Table RE-10. Estimated Recreation Annual Budget Needs

Boise NF	Payette NF	Sawtooth NF
$6,624,071	$3,259,080	$6,485,439

* Estimates were rounded to the nearest $1,000.

Recreation objective accomplishment will always be dependent upon allocated funds to a large extent. Partnership developments and programs such as the Fee Demo that provide local funding opportunities help offset funding shortfalls but have never closed the gap between what was allocated and what is needed. Since budget allocations vary from year to year and are affected by national, political, and agency priorities, it is difficult to predict final recreation budget allocations. Since there is no direct linkage between stated Forest Plan budget needs and what Congress eventually allocates, there is no assurance that final budget levels will even approach those stated in Forest Plans.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Laws, Regulations, and Policies – Numerous laws, regulations, and policies govern the management of recreation resources on National Forest System lands. These are listed in *Appendix H*, Legal and Administrative Framework. One of the most important of the laws is Public Law 92-400 of 1972, which created the Sawtooth National Recreation Area and established general management direction for the designated area.

Forest Plan Direction - Management prescriptions for three land use allocations (MPC 4.1, 4.2, and 4.3) are specifically designed to provide areas where recreation resources and uses are emphasized. Each prescription is designed to meet the objectives of two ROS classes and contains direction to manage the recreation settings to the standards established for their ROS classifications. Standards and guidelines within the prescriptions, as well as at the Forest-wide and Management Area levels, will be applied to ensure that appropriate recreation settings and opportunities are provided for a wide range of uses and activities.

Forest Plan Implementation - Almost all management activities and uses of the Forests have the potential to alter recreation settings, resources, and experiences. As a result, effects on the following recreation elements will be assessed during all project proposal analyses:

- *ROS Classification* – Project proposals will be evaluated relative to their consistency with the ROS strategy for the Forest. In most cases, projects will be designed to maintain or enhance the ROS strategy classification. When a deciding official accepts a project that is not consistent with the ROS strategy, a determination is made as to whether the significance of the project to the ROS strategy warrants a Forest Plan amendment. The full effects of either of these outcomes will be analyzed. (See also *Appendix F* in the revised Forest Plans.)

- *Recreation Improvements and Developments* - New resource projects will be designed to protect developed recreation sites, National Forest System trails, and their associated high quality recreation experiences. Avoidance of developed sites and improvements during site-disturbing activities will be the preferred mitigation technique. Facility and trail re-location, decommissioning, and closure will be last resort options in cases of overriding developments.

- *Dispersed Use* – Potential effects on dispersed recreation experiences will be analyzed during new project design and analysis. When possible, adjustments to proposed activities and uses to protect dispersed recreation experiences will be the preferred mitigation technique.

General Effects

Recreation opportunities occur on virtually every acre of National Forest within the Ecogroup. Given this, almost every management activity as well as a wide array of disturbance events can potentially affect recreation opportunities and experiences. Effects on recreation opportunities and experiences are generally the result of changes to either or both recreation settings and/or the level of access. The relative amount of these effects may, in some cases, vary by alternative. However, they are likely to be present to some extent in all alternatives.

Visual attractiveness is an inherent component of most recreation experiences on National Forests. Potential effects to visual resources are addressed in the *Scenic Environment* section of this chapter.

Developed Recreation Supply and Demand – With most of the local population bases increasing and aging, it is likely that the demand for developed recreation facilities will also increase to some extent. However, given uncertain recreation budgets, insufficiently maintained existing facilities, and the prospect of continued or increasing difficulties for recreation facility development and expansion from additional threatened and endangered species listings, there is some level of uncertainty as to the Forests' ability to respond to developed recreation needs.

As a general policy, it can be expected that recreation funds will be spent on improved maintenance in existing facilities rather than developing new facilities. This priority is due in large part to the current backlog of deferred recreation maintenance needs. However, a small level of new facility development may still occur. New development would be likely to be driven either by the need to mitigate resource impacts from recreation developments or uses, or as a result of partnership opportunities with other agencies and organizations. Examples might include conversion of heavily used dispersed areas into minimum-standard developed sites. Generally, the trend will likely be at a minimum development scale and characterized as low cost, low maintenance, and minimum impact.

Although partnership opportunities help to increase recreation opportunities and the quality of recreation experiences, they don't necessarily align with Forest priorities. As a result, what may be constructed may improve some recreation opportunities and experiences, but still may not address the established needs and priorities.

Even with some new development as described above, the net result is that developed facility capacity is likely to be less than what is needed in highly popular areas. This means that during peak use some users cannot use the facilities or the locations that they would prefer. It also suggests a higher potential for resource damage in and around developed facilities due to overuse and overflow use in the immediate vicinity.

Recreation/Resource Conflicts - Impacts from recreation facilities and activities on threatened and endangered species and their habitat are analyzed in consultation processes with regulatory agencies, as required by the Endangered Species Act. Mitigations are then developed to either eliminate adverse effects or reduce them to insignificant levels. Since these actions are required by law, they would be the same in any alternative. More detailed information is presented below in the Aquatic, Riparian, and Watershed Management and Wildlife Management discussions.

Recreation/Grazing Conflicts - Effects related to conflicts between recreation uses and domestic livestock grazing would vary to some extent by alternative. Livestock grazing and range improvements may result in an altered landscape appearance. Signs of livestock grazing, such as driveways, cropped forage, trampled vegetation, and manure, or odors associated with livestock use may be offensive to some recreationists. Cattle using an area can cause multiple trail paths, creating confusion as to actual location of trails. Cattle can also inadvertently knock down trail and interpretive signs. Conflicts can occur between visitors and livestock during herding or driving operations and occasionally with the dogs used by permittees to control herds. Alternatives 2, 3, 4, 6, and 7 reduce or eliminate grazing in two areas highly popular with recreationists (Adams Gulch, a portion of the Big Wood drainage, and Howell Canyon). These changes would improve recreation experiences in these areas for some users. However, judging from past similar situations, overall use of these areas is not expected to increase as a result of this action. Even with the presence of livestock, these areas are highly popular and experience a high level of use. Potential conflicts between recreationists and livestock would be eliminated in these areas under these alternatives. For the vast majority of the Ecogroup, livestock grazing effects on recreation opportunities and experiences are not expected to differ by alternative.

Timber Harvest – The effects from timber harvest are potentially the greatest in areas where little or no timber management has occurred. Most of these areas are characterized by an undeveloped landscape with an undisturbed appearance, such as areas classified as Primitive and Semi-Primitive in the ROS inventory. Conversely, additional timber cutting in areas that already incorporate obvious, visible evidence of past timber management activities may result in much lower levels of impacts.

The effects of timber harvest activities on recreation settings and experiences can vary substantially. Timber harvest intensities can range from highly dispersed selection harvests to extremely concentrated, even-aged regeneration harvests. Associated access developments can also range from construction of new classified roads to none at all with helicopter yarding methods. Generally, even-aged regeneration harvests such as clearcuts create long-term changes to the landscape, resulting in changes to the recreational setting. When such changes occur in primitive or semi-primitive settings, they are likely to displace some users who prefer less developed settings and the experiences they offer. This effect is supported by the fact that a shortage of semi-primitive motorized settings was identified by the SCORTP. This indicates that a wide range of recreation users prefers natural-appearing landscapes. At the same time, timber sale development can create additional opportunities, particularly for motorized experiences in semi-developed settings. Examples include improved firewood gathering and conversion of unused skid trails and logging roads to ATV or horse trails. This shift in opportunities and uses is long-term in effect since these types of harvests are evident for a number of decades. Timber harvests that are less intense than regeneration harvests, such as thinnings, partial cuts, and selection cuts, usually have reduced long-term impacts due to the smaller scale of change to recreation settings.

Temporary and short-term effects from all types of timber harvest activities are created during active logging operations. Effects can include increased noise and dust levels, logging truck use of back roads and highways, and snow removal during winter operations, from roads used for snowmobiling, cross-country skiing and snowshoeing. Generally, little recreation use occurs in active logging areas. Most users will be displaced to other locations during active logging operations because of log truck traffic along access roads, helicopter operations, and setting disturbances such as chainsaw and heavy equipment noises.

Timber salvage activities usually involve harvesting dead, infected, and/or potentially infected trees, which can result in development that alters recreation settings and experiences. In that salvage harvest activities are often linked to disturbance events such as wildfire, weather events, and insect epidemics, it is difficult to accurately predict amounts or locations of salvage activity. In some cases, salvage harvesting occurs in conjunction with other timber harvest activities. In all cases, the potential effects of salvage harvest activities on recreation settings and experiences are the same as other timber harvest activities.

Roads and Trails - Maintenance, construction, re-construction, and decommissioning can all affect recreation opportunities and experiences. Road construction and re-construction are usually associated with timber harvest, facility development, utility corridors, telecommunication sites, and mineral and energy development. Roads are also built or improved to meet recreation needs and activities. Current trends indicate increasing recreation-related road maintenance and reconstruction. Trails are constructed primarily for recreation purposes. New or improved access generally increases overall recreation use of the area served by the improved access. New roads and motorized trails into areas that were previously undeveloped can also change the setting by introducing motorized use that may displace some users who prefer less developed settings and the experiences they offer. This shift in opportunities and uses is usually long term because roads and trails are long-lasting features. However, management actions—such as road closures and decommissioning and trail travel restrictions—can mitigate setting shifts to some extent, preserving some semi-primitive opportunities and experiences.

Improving a road's standard—such as from a single-lane native surface road to a two-lane paved road—can also affect recreation use and distribution. Improved access generally improves user comfort as well as speed of access. In some cases, these improvements can result in increased use in areas serviced by the access, and possibly shifting use from other areas where access quality remains the same. Currently, there are ten roads within the Ecogroup that are being considered for improvement under all alternatives. About half of these improvement projects would improve the standard above their current standard for only along 2 or 3-mile segments of these roads. The other half of these projects range from 6 to 14 miles of improvement. These improvement projects are still in very preliminary stages of development and still need to be analyzed on a site-specific basis prior to project approval and implementation. Each road improvement project may change substantially or be dropped from further consideration as further information is gathered and considered. As such, accurate effects from these improvements are difficult to determine at this time. All of the longer group of road improvements are likely to increase levels of recreation traffic, use, and shifts in both dispersed and developed sites that are accessed by these roads to some extent. In the cases where only relatively short lengths of road would be improved, the increased use is likely to be slight and limited to relatively small areas. Accomplishment of these road improvements is very dependent on capital improvement funding within the agency. Priorities can also shift dramatically, for varied reasons, which may cause some projects to rise in priority or drop completely off the capital improvement list.

Disturbance Events – Wildland fire, insects, disease, landslides, and other disturbance events can greatly affect recreation opportunities and experiences, especially when the scale of these events is large. Many recreation experiences are highly influenced by the scenic qualities of the setting. The effects of these disturbance events on scenic resources are examined in more detail in the *Scenic Environment* section in this chapter.

Wildland fire, and insect and disease outbreaks can result in large areas of dead trees. For a period of time, large stands of trees killed by insect and disease, can then become fire hazards, indirectly increasing the potential for wildfire effects to recreation experiences. In some cases, salvage logging is used to reduce the risk of fire associated with large areas of tree mortality creating additional or different short-term and long-term impacts from logging activities, new roads and salvage harvest units.

Effects on recreation opportunities from wildland fire vary depending upon the extent, severity and location. High levels of smoke from wildland fires will affect recreation experiences. Clear, fresh air is a user expectation for a number of recreation experiences, especially in primitive and semi-primitive settings. Smoke from fires can also partially or completely obscure scenic attractions desired in many recreation experiences. During active wildfire seasons, recreation plans may be shifted to less smoky locations, shortened in duration, or cancelled entirely. During extreme fire seasons, area closures for fire prevention may be invoked, limiting or eliminating recreation opportunities over extensive areas. Many people find the post-fire appearance of burned vegetation to be unattractive. Burned landscapes resulting from wildland fire may displace some users who find the appearance of burned-over timber stands to be unsatisfactory. These recreationists may use other areas until the burned area recovers to a more vegetated state.

Dead trees also produce less shade than live trees and can change the desirability of some locations as camping and picnicking sites. In developed recreation sites, dead and diseased trees are considered a safety hazard and are removed to make camp and picnic sites safer for human occupation. When tree mortality or disease levels are high in developed sites, the character of these sites can change dramatically with the reduction of hazardous trees. In extreme cases, sites in forest settings can change into sites in completely open settings.

In areas where disturbance events are allowed to dominate the landscape, the potential for effects from some types of disturbance is likely to increase over the long term. It is difficult to predict how or where or when these natural changes might occur due to influential variables such as vegetation patterns, disturbance regimes, climate, and topography.

Prescribed Fire – Prescribed fire can also result in many of the same effects noted for wildland fire above. Visibility and air quality impairment as well as burned landscapes usually result from prescribed fire, however the extent and duration of these effects may be less than those of wildfire. Prescribed fire intensities, severity, and scale can be lower and smaller and result in reduced setting impacts of shorter duration than wildland fires. Prescribed fire can also create conflicts in the fall when burning windows occur when big game and bird hunting activities are at their peak. These effects are generally thought to be small, localized, and short-term in duration. In some cases, prescribed fire may improve recreation opportunities. For instance, fire can be used to achieve timber stand characteristics that allow easier recreation access or that some recreationists find more attractive such as open stands of large trees.

Non-Native Plants – Invasion by exotic plants (primarily noxious weeds and non-native grasses) can alter recreation experiences both directly and indirectly. Recreation experiences may be directly affected when invasions become extreme enough to warrant travel restrictions and recreational access becomes limited to only selected routes or forms of travel. Some recreationists find heavy concentrations of some exotic plants, such as star thistle, unpleasant to walk through, changing recreation use patterns and locations. Indirectly, hunting opportunities and hunter success levels may be reduced if winter ranges become ineffective due to non-native plant invasion. Similarly, opportunities for wildlife viewing and photography may also decline in highly infested areas. Fishing opportunities may also decrease somewhat due to increased sedimentation in highly infested areas.

Mineral and Energy Exploration, Development, and Reclamation – Exploration and development can potentially result in long-term effects to recreation settings from development in previously undeveloped landscapes. These effects would vary depending largely upon the scale and location of development. Small-scale developments of a few acres, or underground mining, would have a very limited impact, while large-scale mining operations covering hundreds of acres could potentially have major effects on recreation settings. During active operations, recreation uses may be affected by increased noise and dust levels, temporary access closures, and from heavy vehicle use of back roads and highways. Displacement of users into other areas during periods of active operation could occur, but would likely be small in scale, localized, and temporary in duration.

Mining reclamation activities would generally have little effect on recreation settings in that settings would already have been altered by the mining development. Reclamation effects would probably be limited to temporary and short-term impacts associated with active operations. In that the level of mineral exploration and development is largely driven by market forces and regulated by existing mining law, there would be little difference between the alternatives in effects on recreation opportunities and experiences. Reclamation activities may vary depending on differences in alternative restoration emphasis.

Facilities and Structures – These include a broad array of physical developments and structures, such as administrative facilities, communications developments, and dams and diversions authorized under special use authorizations. Usually, there are short-term impacts from active construction operations and long-term impacts to recreation settings from structures, vegetation clearing, and ground-disturbance activities. These effects vary depending on the scale and nature of the development, as well as the setting itself. Long-term effects are usually greatest when these developments occur in primitive and semi-primitive areas with little or no previously existing development. In such cases, permanent recreation use displacement may occur among users who prefer less developed settings and the experiences they offer. Some of these structures also may convert recreation opportunities, such as when dams replace whitewater-floating experiences with motorized boating experiences.

Utility Developments – These developments include pipelines and overhead powerlines that can result in short-term impacts from active construction operations and long-term effects from associated permanent structures, vegetation clearing, and ground-disturbance activities. Long-term effects are usually greatest when these developments occur in primitive and semi-primitive areas with little or no previously existing development. In such cases, permanent recreation use displacement may occur among users who prefer less developed settings and the experiences they offer. In some areas, utility corridors may improve access by providing a cleared corridor that can be used for hiking, mountain biking, horse riding and other uses, potentially increasing access and recreation opportunities. Corridors for anticipated utility line needs are described in the Management Area sections of the Forest Plan. Site-specific analysis would be required prior to approval or implementation of any utility corridor development.

Aquatic, Riparian, and Watershed Management – Biological assessments for sockeye salmon, chinook salmon, steelhead, and bull trout done in the mid-1990s identified a number of recreation sites and activities across the Ecogroup area that, under current management, were likely to adversely affect fish populations. Most of these sites have been modified to mitigate the impacts to these fish species. For example, campsites adjacent to the South Fork of the Salmon River and Johnson Creek were removed from the South Fork Salmon River and Icehole Campgrounds. Portions of these facilities were also "hardened" with paved surfacing to reduce sedimentation as part of the mitigation effort. A number of developed sites within the Salmon River canyon below Stanley have also been modified to protect chinook salmon. Across the Ecogroup area, currently four sites and four recreation activities remain to be addressed with mitigation. The exact extent and nature of the mitigation measures would be determined at the project level and would be common to all alternatives.

Watershed and fisheries improvement actions can include construction of structures for streambank stabilization (rock gabions, rock riprap, etc.), slope stabilization, and fish habitat improvement. Some structural improvements may be visually evident and may detract from the natural landscape. Negative impacts may be mitigated through design and location options, and vegetative cover plantings where possible. Generally, improvement structures are small and localized, and result in little or no effect on recreation settings and facilities.

Wildlife Management – Wildlife management actions can directly affect recreation opportunities in a number of ways. In a growing number of cases, protection measures designed to protect diminishing or vulnerable species result in access, development, or activity restrictions. Examples include:

- Seasonal access restrictions at nesting sites for bald eagles, peregrine falcons, and goshawks.
- Seasonal access restrictions within occupied wolverine denning areas.
- Seasonal access restrictions for caves and mines that possess occupied bat hibernaculum.
- Seasonal access restrictions within big-game winter/spring ranges.
- Seasonal access restrictions within selected big-game management units for deer and elk in cooperation with state fish and game agencies.
- Recreational suction dredging access restrictions on stream sections that provide spawning habitat for threatened and endangered fish species.
- No net increase in groomed or designated over-the-snow routes and snowmobile play areas within identified lynx habitat.

Seasonal access restrictions can result in more concentrated use of roads and areas that remain open, reducing opportunities for motorized experiences, while possibly increasing non-motorized opportunities in areas that are not closed to all human intrusion. Winter recreation trail-oriented opportunities will be limited to their current extent in identified lynx habitat. Given the extensive area of identified lynx habitat within the Ecogroup area, this is likely to be a significant limitation to expansion of winter recreation opportunities. In that most of these restrictions arise from biological assessments and opinions and conservation agreements, they apply in every alternative, and their effects would be the same in every alternative.

Wildlife management actions may result in a broad array of physical alterations including vegetation manipulations (stand, structure, and composition cuts, browse species plantings, etc.), prescribed burning, and habitat improvement structures. Some structural improvements may be visually evident and detract from the natural landscape. Others may be designed to improve the scenic environment over the long term. Negative impacts may be mitigated through design and location options, and vegetative cover plantings where possible. Generally, improvement structures are small and localized, and would have a minor effect on the scenic quality of the surrounding area.

Recreational benefits from successful wildlife management could include increased hunter satisfaction and wildlife viewing opportunities.

Cave Management – Cave resources are considered non-renewable because of the unique conditions under which they formed, the time it took them to develop, and the sensitivity of microclimates within caves. The Federal Cave Resources Protection Act of 1988 requires the protection of significant caves found on federal lands. New Forest Plan direction may result in limitations on human access to significant caves in an attempt to protect cave resources. However, improved protection of these resources will result in reduced vandalism, theft of geological formations, disturbance to cave plants and wildlife populations, and threats to cave environments from heavy equipment. These effects would contribute to preserving recreational caving experiences into the future. Because protection of cave resources is mandated by law, these effects are common to all alternatives.

Sawtooth National Recreation Area – Management of the SNRA is directed by PL 92-400 and regulations set by the Secretary of Agriculture. Because the purpose and goals of the SNRA are largely defined by special legislation, management differences between alternatives would not be dramatic. An exception to this is in the acres of the SNRA that are recommended for wilderness designation. Recommendations for wilderness designation under each alternative are described and analyzed in the *Inventoried Roadless Areas* section of this chapter.

Direct and Indirect Effects by Alternative

Analysis Details

Information presented in the following analyses has been extracted from a more extensive technical report in the interest of brevity of the EIS. Analysis methodology is not detailed in the EIS and actual figures are, in most cases, rounded. The technical report is available upon request if full details regarding methodology and exact figures are desired.

Indicator 1 - Recreation Settings

Potential management activities associated with each alternative would have varying effects on recreation opportunities by influencing the settings. Recreation settings could potentially be altered by a number of management activities under each alternative such as timber harvest, road construction, restoration treatments, and fuel reduction treatments. Another source of potential change to recreation settings would stem from management direction that would affect motorized access and uses. One method of estimating changing recreation settings is to compare estimated acreages of ROS class shifts from the current ROS inventory that would be needed to reflect the prescribed management under each alternative. The ROS provides the framework for analyzing changes to recreation settings that may arise as a result of new development, such as timber harvest and road construction, as well as changes resulting from motorized access adjustments. However, the ROS cannot be used to address changes in recreation settings that would arise from fire use activities because ROS classes are unaffected by burned or unburned conditions. Each alternative's potential for changing recreation settings as a result of fire use is included in a separate analysis below for restoration activities.

Acreages for each ROS class under each alternative were estimated based on changes to the ROS inventory that would be needed to reflect estimated levels of mechanical vegetation treatments, new road construction, and new motorized use prohibitions in recommended wilderness. SPECTRUM modeling estimates were used for new road construction and mechanical vegetation treatments. Estimates were calculated for 15 years of management activities (2018) to approximate the net changes at the end of the next planning period. Although changes to ROS classification could occur from a wide variety of management actions and developments, these management actions would comprise the vast majority of ones that would be likely to result in changes to the ROS inventory. Estimates for total ROS class acreages under each alternative are displayed in Tables RE-11 and RE-12.

Table RE-11. Estimated Acres of Summer ROS Class by Alternative for Each Forest by 2018[1]

ROS Class[2]	Summer ROS Acres						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise National Forest							
P	0	0	0	66,000	0	11,000	0
SPNM	457,000	454,000	448,000	531,000	447,000	490,000	457,000
SPM	408,000	406,000	403,000	282,000	403,000	377,000	408,000
RN	404,000	404,000	404,000	404,000	404,000	404,000	404,000
RM	929,000	934,000	943,000	915,000	944,000	915,000	929,000
R	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Payette National Forest							
P	768,000	768,000	768,000	847,000	768,000	785,000	768,000
SPNM	454,000	458,000	453,000	598,000	452,000	469,000	458,000
SPM	412,000	415,000	411,000	196,000	410,000	387,000	415,000
RN	263,000	262,000	263,000	263,000	263,000	263,000	263,000
RM	402,000	395,000	405,000	395,000	407,000	395,000	395,000
R	0	0	0	0	0	0	0

ROS Class[2]	Summer ROS Acres						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Sawtooth National Forest							
P	227,000	227,000	227,000	273,000	227,000	317,000	227,000
SPNM	367,000	367,000	366,000	952,000	367,000	714,000	367,000
SPM	724,000	724,000	722,000	111,000	724,000	1,005,000	724,000
RN	295,000	295,000	295,000	293,000	295,000	73,000	295,000
RM	494,000	494,000	497,000	482,000	494,000	2,000	494,000
R	4,000	4,000	4,000	0	4,000	0	4,000

[1]Acreages are rounded to the nearest 1,000 acres. Totals may differ slightly due to rounding.
[2]ROS Class Abbreviations: P = Primitive; SPNM = Semi-Primitive Non-Motorized; SPM = Semi-Primitive Motorized; RN = Roaded Natural; RM = Roaded Modified; R = Rural.

Table RE-12. Estimated Acres of Winter ROS Class by Alternative for Each Forest by 2018[1]

ROS Class[2]	Winter ROS Acres						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise National Forest							
P	0	0	0	66,000	0	11,000	0
SPNM	206,000	204,000	202,000	698,000	201,000	347,000	206,000
SPM	1,725,000	1,716,000	1,702,000	1,167,000	1,700,000	1,573,000	1,725,000
RN	167,000	167,000	167,000	167,000	167,000	167,000	167,000
RM	100,000	110,000	128,000	100,000	130,000	100,000	100,000
R	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Payette National Forest							
P	768,000	768,000	768,000	845,000	768,000	788,000	768,000
SPNM	446,000	447,000	445,000	755,000	444,000	605,000	447,000
SPM	737,000	745,000	733,000	359,000	730,000	567,000	745,000
RN	39,000	39,000	39,000	39,000	39,000	39,000	39,000
RM	310,000	301,000	315,000	301,000	318,000	301,000	301,000
R	0	0	0	0	0	0	0
Sawtooth National Forest							
P	219,000	219,000	219,000	240,000	219,000	304,000	219,000
SPNM	123,000	123,000	122,000	410,000	123,000	243,000	123,000
SPM	1,696,000	1,696,000	1,690,000	686,000	1,696,000	1,489,000	1,696,000
RN	71,000	71,000	71,000	293,000	71,000	73,000	71,000
RM	0	0	6,000	482,000	0	2,000	0
R	2,000	2,000	2,000	0	2,000	0	2,000

[1]Acreages are rounded to the nearest 1,000 acres. Totals may differ slightly due to rounding.
[2]ROS Class Abbreviations: P = Primitive; SPNM = Semi-Primitive Non-Motorized; SPM = Semi-Primitive Motorized; RN = Roaded Natural; RM = Roaded Modified; R = Rural.

ROS class shifts can be estimated for each alternative by comparing resultant acreages with the current ROS inventory acreages. In that these ROS shift estimates are based on modeling outputs, they are not absolute measures of acres of ROS shift but are relative measures of potential shifts between the alternatives. They serve to compare relative differences in outcomes between the alternatives. The potential for changes to existing recreation settings is reflected in the changes in the ROS class levels associated with each alternative, and is displayed in Tables RE-13 and RE-14.

Table RE-13. Estimated Acres of Summer ROS Class Change by Alternative for Each Forest by 2018[1]

ROS Class[2]	Summer ROS Acres						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise National Forest							
P	0	0	0	+66,000	0	+11,000	0
SPNM	-29,000	-33,000	-39,000	+44,000	-40,000	+4,000	-29,000
SPM	+16,000	+14,000	+11,000	-110,000	+11,000	-15,000	+16,000
RN	0	0	0	0	0	0	0
RM	+14,000	+19,000	+28,000	0	+29,000	0	+14,000
R	0	0	0	0	0	0	0
Payette National Forest							
P	0	0	0	+79,000	0	+17,000	0
SPNM	-3,000	0	-5,000	+140,000	-6,000	+11,000	0
SPM	-3,000	0	-4,000	-219,000	-5,000	-28,000	0
RN	0	0	0	0	0	0	0
RM	+6,000	0	+10,000	0	+12,000	0	0
R	0	0	0	0	0	0	0
Sawtooth National Forest							
P	0	0	0	+46,000	0	+13,000	0
SPNM	-1,000	0	-2,000	+584,000	0	+42,000	0
SPM	-17,000	0	-19,000	-630,000	0	-55,000	0
RN	+2,000	0	+2,000	0	0	0	0
RM	+12,000	0	+15,000	0	0	0	0
R	+4,000	0	+4,000	0	0	0	0

[1]Acreages are rounded to the nearest 1,000 acres. Positive values represent increases in acreages; negative values represent decreases. Forest changes totals may not equal 0 due to rounding.
[2]ROS Class Abbreviations: P = Primitive; SPNM = Semi-Primitive Non-Motorized; SPM = Semi-Primitive Motorized; RN = Roaded Natural; RM = Roaded Modified; R = Rural.

Table RE-14. Estimated Acres of Winter ROS Class Change by Alternative for Each Forest by 2018[1]

ROS Class[2]	Winter ROS Acres						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise National Forest							
P	0	0	0	+66,000	0	+11,000	0
SPNM	0	-2,000	-4,000	+492,000	-5,000	+141,000	0
SPM	0	-9,000	-24,000	-558,000	-26,000	-152,000	0
RN	0	0	0	0	0	0	0
RM	0	+10,000	+28,000	0	+30,000	0	0
R	0	0	0	0	0	0	0
Payette National Forest							
P	-8,000	-8,000	-8,000	+70,000	-8,000	+13,000	-8,000
SPNM	+6,000	+8,000	+5,000	+316,000	+5,000	+165,000	+8,000
SPM	-7,000	0	-12,000	-386,000	-14,000	-178,000	0
RN	0	0	0	0	0	0	0
RM	+9,000	0	+14,000	0	+17,000	0	0
R	0	0	0	0	0	0	0
Sawtooth National Forest							
P	-61,000	0	-61,000	+37,000	0	+24,000	0
SPNM	+67,000	0	+66,000	+658,000	0	+187,000	0
SPM	-5,000	0	-10,000	-695,000	0	-211,000	0
RN	-2,000	0	-2,000	0	0	0	0
RM	-2,000	0	+4,000	0	0	0	0
R	+2,000	0	+2,000	0	0	0	0

[1]Acreages are rounded to the nearest 1,000 acres. Positive values represent increases in acreages; negative values represent decreases. Forest changes totals may not equal 0 due to rounding.
[2]ROS Class Abbreviations: P = Primitive; SPNM = Semi-Primitive Non-Motorized; SPM = Semi-Primitive Motorized; RN = Roaded Natural; RM = Roaded Modified; R = Rural.

The most dramatic shifts in summer ROS classes would occur in Alternative 4 for all three Forests. The shift in Alternative 4 would go from the Semi-Primitive Motorized class toward the Semi-Primitive Non-Motorized and Primitive classes, with little or no shifts in other classes, due to the general low level of development activities. These shifts are due to a combination of the prohibition of motorized use in recommended wilderness areas and the high level of recommended wilderness in that alternative. The effects under Alternative 6 would be in a similar direction but on a lower scale due to the lower level of recommended wilderness.

Summer ROS shifts under the remaining alternatives would largely be in favor of the more developed and motorized classes where lower levels of challenge and risk are generally found, with more evidence of humans, and a higher level of user interaction. The scale of ROS differences varies by Forest due to differing levels of potential development. ROS shifts toward more developed classes are likely to be the highest under Alternative 5 for both the Boise and Payette Forests. On the Boise, Alternatives 1B, 2, 3, and 7 present somewhat smaller shifts toward more developed recreation settings, with shifts under Alternative 3 being almost as large as those under Alternative 5. On the Payette, Alternatives 1B and 3 present shifts toward the more developed classes, while Alternative 7 would largely result in little or no ROS shifts to the more developed classes. On the Sawtooth, Alternatives 1B and 3 present shifts toward the more developed classes, while Alternatives 2, 5, and 7 would largely result in little or no ROS shifts to the more developed classes.

The levels of both Roaded Natural and Rural do not shift dramatically under any alternative. This is because the development and use that generates these ROS classifications would not be likely to disappear under any alternative. Changes to these two classes would likely be limited to additions resulting from additional development.

Many of the effects for the winter ROS inventories are similar to those of the summer. There would be sizeable shifts to the less developed classes and undeveloped classes under Alternative 4, with a somewhat smaller shift under Alternative 6. On the Boise, Alternatives 2, 3, and 5 result in modest shifts toward developed classes, while Alternatives 1B and 7 result in little or no shifts. On the Payette, Alternatives 1B, 3, and 5 result in somewhat smaller shifts toward developed classes, while Alternatives 2 and 7 result in little or no shifts. On the Sawtooth, Alternatives 1B and 3 result in moderate shifts toward developed classes, while Alternatives 2, 5, and 7 result in little or no shifts.

During both summer and winter periods, areas classified as Semi-Primitive Motorized would be likely to shrink under Alternatives 4 and 6 for all three Forests. This stems from the prohibition on motorized use within recommended wilderness under those alternatives. The scale of the reduction is considerably larger in Alternative 4 than Alternative 6 due to the far greater recommended wilderness area in Alternative 4.

On the Boise, summer Semi-Primitive Motorized areas would expand moderately under all the remaining alternatives, with Alternatives 1B and 7 showing the largest gains. Winter Semi-Primitive Motorized areas would also shrink somewhat under Alternatives 2, 3, and 5, although not near as much as Alternatives 4 and 6. This change under Alternatives 2, 3, and 5 would be due to development of recreation settings from mechanical treatments and road construction rather than motorized use prohibitions. Winter Semi-Primitive Motorized areas would stay about the same as the current level under Alternatives 1B and 7.

On the Payette, both summer and winter Semi-Primitive Motorized areas would shrink slightly under Alternatives 1B, 3, and 5, although to a much lower extent than under Alternatives 4 and 6. This would occur as a result of development activities rather than increasing motorized use prohibitions. Semi-Primitive Motorized areas would stay about the same as the current level under Alternatives 2 and 7.

On the Sawtooth, both summer and winter Semi-Primitive Motorized areas would shrink slightly under Alternatives 1B and 3, although to a much lower extent than under Alternatives 4 and 6. This would occur as a result of development activities rather than increasing motorized use prohibitions. Semi-Primitive Motorized areas would stay about the same as the current level under Alternatives 2, 5, and 7.

On a Forest-wide basis, changes in the ROS class proportions due to development would occur gradually over time because implementation of projects would not happen all at once. While some areas are likely to have significant alterations over the next decade, others may not be affected, or affected only minimally for a much longer period of time. The duration of the effects would generally be long term but could also vary depending upon the nature of the development or management activity. The estimated ROS class changes displayed in Tables RE-12 and RE-13 represent the sum total effect of anticipated development over the 15 years following the revised Forest Plan decision.

Indicator 2 - Uncharacteristic Wildfire Hazard and Fuel Reduction Activities

Treatments to reduce the risk of uncharacteristic wildfire or to reduce fuel loadings could include mechanical harvest and thinning, fire use, or some combination of the above. Recreation opportunities and experiences would likely be temporarily unavailable within and adjacent to the treatment areas during mechanical or prescribed fire treatments. Some recreationists may not find the recreation settings changed by new harvest units or blackened landscapes to be appealing and may seek other locations for their recreational activities. This effect would generally be temporary or short term; during which time the recreation opportunities or experiences would be displaced or shifted to other areas. These shifts might be as close as the next drainage or in a totally different portion of the Forest. The treatments would most likely occur in areas assigned to MPC 5.1 or 6.1 that currently have either high or extreme ratings for uncharacteristic wildfire hazard or resistance to control. (Uncharacteristic wildfire hazard and resistance to control ratings are further explained in the *Vegetation Hazard* section in this chapter.) The acreages for these areas on each Forest under each alternative are displayed in Table RE-15.

For all three Forests, Alternative 3 would likely result in the highest potential levels of recreation use disturbance and displacement due to vegetation restoration and fuels reduction activities. On the Boise, Alternative 2 also presents a high level of potential displacement, while all the other alternatives present relatively moderate levels. Alternative 6 results in the lowest level on the Boise. On the Payette, Alternative 4 presents no areas assigned to MPC 5.1 or 6.1 that currently have either high or extreme ratings for uncharacteristic wildfire hazard or resistance to control, giving it the lowest potential for recreation use disturbance and displacement. All of the remaining alternatives result in moderate levels between Alternatives 3 and 4. On the Sawtooth, Alternative 1B results in the lowest level while Alternative 6 is higher but still relatively low. All the remaining alternatives on the Sawtooth result in moderate levels of potential disturbance and displacement between Alternative 6 and Alternative 3.

Table RE-15. Approximate Acres Having High or Extreme Ratings for Uncharacteristic Wildfire Hazard or Resistance to Control Assigned with MPCs 5.1 or 6.1*

National Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	559,000	769,000	931,000	380,000	473,000	329,000	434,000
Payette	118,000	227,000	391,000	0	232,000	135,000	177,000
Sawtooth	17,000	343,000	489,000	190,000	253,000	70,000	314,000

* Acreages have been rounded to the nearest 1,000 acres.

Predicting the spatial locations and durations of these short-term recreation use displacements is difficult because of the many variables that affect these shifts. Combinations of vegetation types, recreation uses affected, burn intensity, severity, extent and timing could all produce an array of potential outcomes that could range from slight to high levels of disturbance to current recreation uses. However, subwatersheds having high or extreme ratings for uncharacteristic wildfire hazard and resistance to control can provide a spatial sense of where hazard and fuel reduction activities are most likely to occur. These areas are displayed in Figures RE-1, RE-2, and RE-3. Areas where either of these conditions exist that also happen to be adjacent to populated areas or areas with substantial capital investment would be likely to be the highest treatment priorities.

Indicator 3 - Aquatic, Riparian, and Watershed Restoration Activity Effects on Developed Recreation

Aquatic, Riparian, and Watershed management direction in the Forest Plans could have potential effects on developed recreation facilities. This direction would be used to guide the development of new facilities and to mitigate impacts originating from existing facilities. New construction of recreation developments within areas assigned MPCs of 3.1 or 3.2 would not be precluded. However, required mitigation measures would likely increase the costs for these facilities substantially. Resource protection considerations would also far outweigh user convenience or other recreation-driven considerations in determining the locations of new facilities.

Existing developed recreation facilities within subwatersheds identified as high priorities for active restoration and also assigned an MPC of 3.2 would be the most likely affected. (Criteria used for determining restoration strategies and watershed and aquatic prioritization are displayed in the *Soil, Water, Riparian, and Aquatic Resources* section of this chapter.) The number of these facilities is shown by Forest and by alternative in Table RE-16.

Figure RE-1 Subwatersheds Having Ratings of High or Extreme for Uncharacteristic Fire or Resistance to Control
Boise National Forest

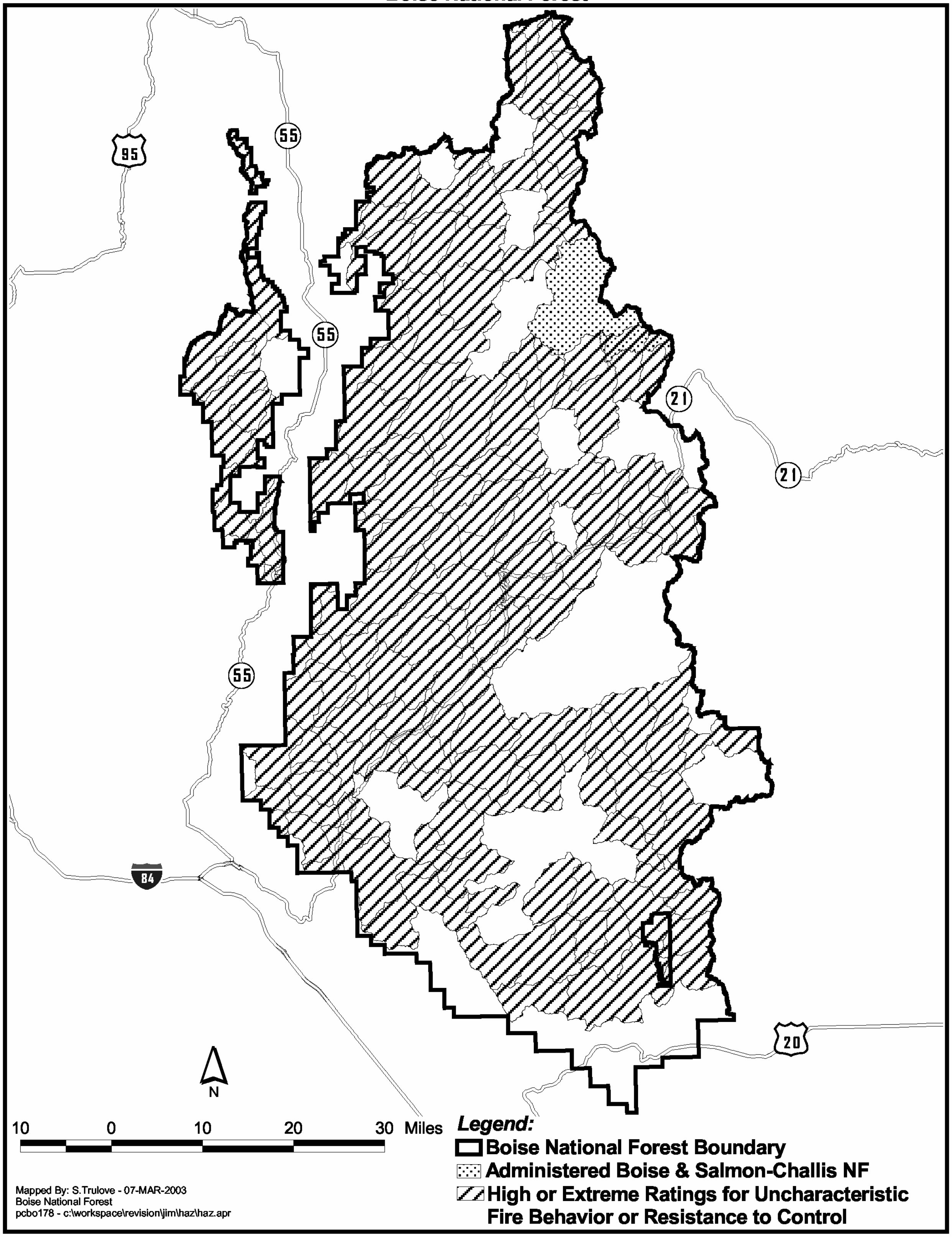


Figure RE-2 Subwatersheds Having Ratings of High or Extreme for Uncharacteristic Fire or Resistnace to Control Payette National Forest

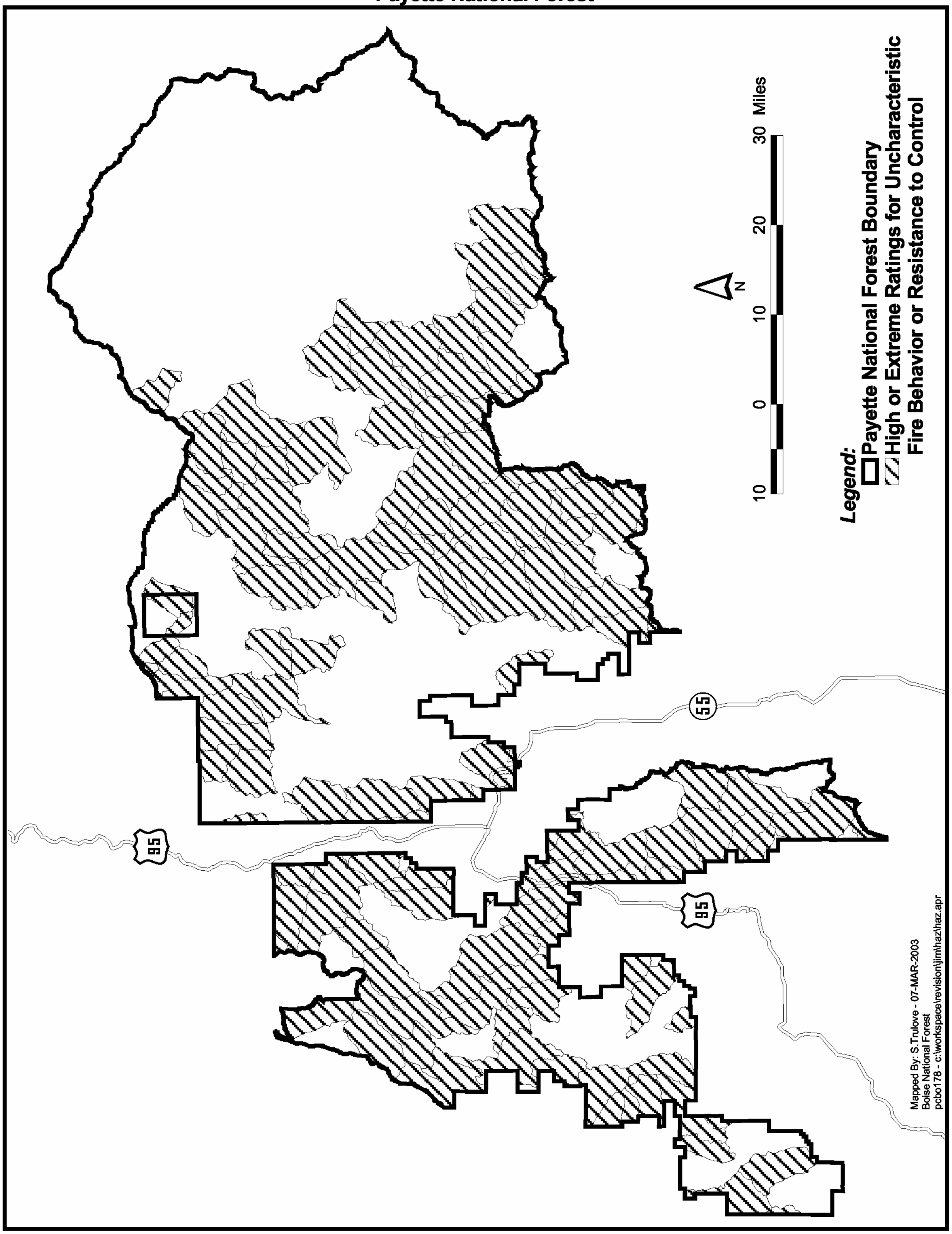


Figure RE-3 Subwatersheds Having Ratings of High or Extreme for Uncharacteristic Fire or Resistance to Control Sawtooth National Forest

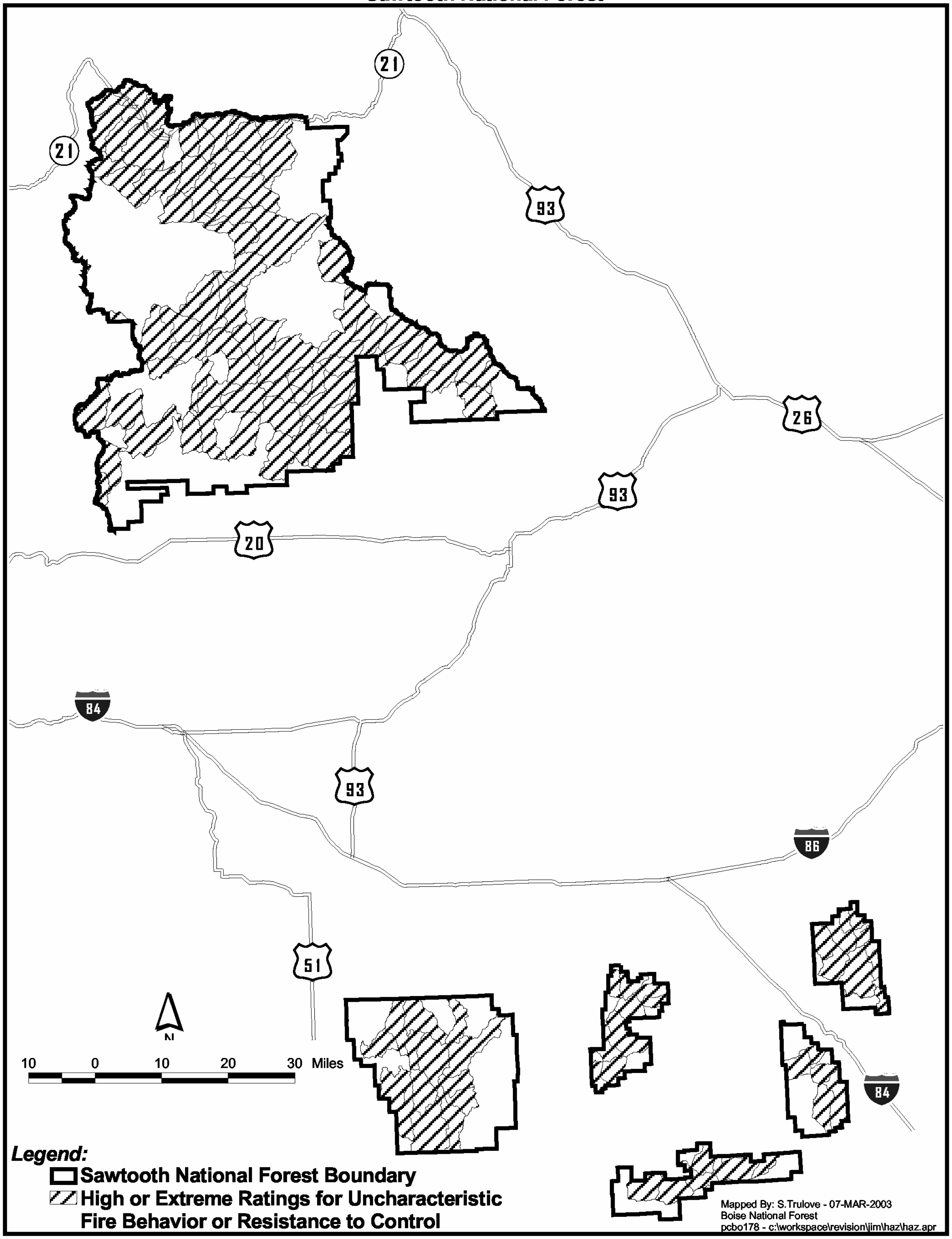


Table RE-16. Developed Recreation Sites within Subwatersheds Having High Priority for Active Restoration and Assigned to MPC 3.2

National Forest	Alternative						
	1B	2	3	4	5	6	7
Boise	0	25	39	19	2	21	22
Payette	0	11	15	5	2	11	14
Sawtooth	0	59	59	7	0	52	58

It should be noted that the figures included in Table RE-12 are not meant to represent the actual number of sites in need of restoration activities. Each developed recreation site represents a unique situation, which would be considered on a case-by-case basis prior to determining if any restoration treatments were warranted. Determinations would be based on actual recreation impacts, management priorities, funding opportunities, and project-level planning decisions within the planning period. As a result, the indicators are intended to show relative differences between the alternatives, rather than to represent the actual number of developed recreation sites that would receive restoration treatments. It should be noted that restoration activities at existing recreation facilities to mitigate known, direct adverse effects from recreation facilities on listed fish species are likely to occur to some extent under *any* MPC assignment in any alternative.

There would be no developed sites assigned to MPC 3.2 for any of the three Forests under Alternative 1B since there is no management prescription similar to 3.2 in the current Forest Plans. As a result, Alternative 1B presents the lowest potential for effects on developed sites on the Boise and Payette. Alternative 5 on the Sawtooth presents a similar situation and extremely low level of potential impact. In some respect these results are somewhat misleading in that some level of impacts could result from site-specific analysis under any alternative. However, it is still likely that the levels of impacts would be the least under Alternative 1B on the Boise and Payette and under Alternatives 1B and 5 on the Sawtooth.

Alternative 3 results in the highest level of developed sites assigned to MPC 3.2, on the Boise, with a total of 39. Results under Alternatives 2, 7, 6, and 4 are similar, ranging from 25 to 19 sites. Alternative 5 results in a very low level of 2 sites, which is consistent with the commodity production theme of the alternative.

The range of results for the Payette is the lowest of the three Forests because it has much fewer developed recreation sites than either the Boise or Sawtooth. This also reflects the fact that the Payette places greater emphasis on providing dispersed recreation opportunities and experiences than developed recreation. Alternative 3 also results in the highest level of developed sites assigned to MPC 3.2 on the Payette, with a total of 15. Results under Alternatives 2, 6, and 7 are similar, ranging from 11 to 14 sites. Alternative 5 results in a very low level of 2 sites, which is consistent with the commodity production theme of the alternative.

Figures for the Sawtooth are substantially higher than those for the Boise and Payette due largely to the high level of recreation development within the Salmon River corridor on the Sawtooth National Recreation Area. Alternatives 3, 2, 6, and 7 all produce similar results on the Sawtooth, ranging from a high of 59 sites in Alternatives 3 and 2, to 52 sites in Alternative 6. Alternative 4 results in only 7 sites, while Alternative 5 results in none.

Potential effects vary from facility to facility due to individual site characteristics and the nature of the resource impacts. Generally, mitigation of impacts is achieved by modifications to the sites that may include removal of some of the facility components or paving critical driving surfaces and paths. In some relatively rare and extreme cases, entire developed facilities are decommissioned and removed or relocated when suitable alternative sites exist. However, a number of the facilities included in the figures in Table RE-12 are small-scale developments, such as minor trailheads, that would probably require little or no modification. In some cases, there would be temporary service interruptions to every facility during mitigation work due to construction activities. Timing of construction work would be scheduled for minimum use periods to the extent possible, but some interruption of service during summer seasons would be likely. Accurate determinations of the effects on each recreation site that could be potentially affected would be determined in site-specific analyses done in subsequent planning processes.

Indicator 4 - Aquatic, Riparian, and Watershed Restoration Activity Effects on Dispersed Recreation

Management direction for soil, watershed, riparian, aquatic, and wildlife resources can potentially result in a variety of effects to dispersed recreation opportunities and experiences. Dispersed recreation activities can cause impacts, such as sedimentation and wildlife disturbance, that may need to be mitigated or eliminated. Potential mitigation ranges from seasonal restrictions to total discontinuance of specific uses. Some mitigation might be mandatory, arising from compliance with the Endangered Species Act, and some would depend on a combination of management emphasis and watershed priority. Although potential mitigation impacts to dispersed recreation activities may occur at any location, subwatersheds identified as high priorities for restoration, with an assigned MPC of 3.1 or 3.2 are the most likely to be affected. Under these MPCs, restoring or maintaining resource conditions would receive high priority and could potentially result in dispersed use restrictions and/or closures to achieve or maintain desired resource conditions. Criteria used for determining restoration priorities are displayed in the *Soil, Water, Riparian, and Aquatic Resources* section of this chapter. Comparing the total acres of MPCs 3.1 and 3.2 within high priority restoration subwatersheds can be used to show relative differences between alternatives in the potential for changes to dispersed recreation opportunities and experiences as a result of aquatic restoration activities. These acreages are displayed in Table RE-17.

Table RE-17. Total Acres of High Priority Restoration Subwatersheds Assigned To MPCs 3.1 or 3.2*

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	0	243,000	316,000	224,000	22,000	72,000	271,000
Payette	0	174,000	448,000	191,000	32,000	71,000	483,000
Sawtooth	0	252,000	314,000	146,000	0	85,000	333,000

* Acreages have been rounded to the nearest 1,000 acres.

The results of this analysis could be somewhat misleading in the case of Alternative 1B on all three Forests and Alternative 5 on the Sawtooth. These alternatives result in no acres within high priority restoration subwatersheds assigned to MPCs 3.1 or 3.2. This does not mean that recreation activities would never be restricted or altered under these alternatives. Use restrictions might result from a number of circumstances such as when required by Biological Opinions issued during site-specific project analyses to address local recreational impacts. The results under Alternatives 1B and 5 simply reflect the fact that there are no MPC 3.1 or 3.2 assignments under those alternatives. However, this analysis is still valid in that the potential level of restrictions or changes to dispersed recreation uses is likely to be the lowest under Alternative 1B on the Boise and Payette and under both Alternative 1B and 5 on the Sawtooth.

On the Boise, Alternative 3 would probably present the greatest potential for restrictions or changes to dispersed recreation uses. Alternatives 7, 2, and 4 would have relatively similar results and would be somewhat lower than Alternative 3. Alternatives 6 and 5 would both have relatively smaller potentials for restrictions or changes to dispersed recreation uses

On the Payette and Sawtooth, Alternative 7 would probably present the greatest potential for restrictions or changes to dispersed recreation uses. Alternative 3 would have relatively similar results but would be somewhat lower than Alternative 7. Alternatives 2, and 4 would likely result in moderate levels. Alternatives 6 and 5 on the Payette, and Alternative 6 on the Sawtooth would have relatively smaller potentials for restrictions or changes to dispersed recreation uses.

Predicting the spatial locations where restrictions or changes to dispersed recreation uses would result from Forest Plan management direction is not possible in a purely programmatic analysis. Changes and restrictions on dispersed recreation activities would require site-specific analyses that are not a part of this planning process. However, a sense of where restrictions or changes to dispersed recreation uses are most likely to be considered may be best represented spatially by subwatersheds that are rated as high priorities for aquatic restoration. These subwatersheds are displayed in Figures RE-4, RE-5, and RE-6.

Indicators 5 and 6 - Potential Changes in Recreational Access

One of the major roles of the transportation network on National Forests is to provide access for recreational use of the Forests. Recreation opportunities are greatly influenced by the type and levels of recreation access. As a result, changes to the transportation network can also have substantial effects on recreation opportunities and experiences. New roads frequently expand access options in areas where access was previously much more limited, while road closures and decommissioning generally result in reducing the types of access that are possible or allowed. Both classified and unclassified roads can be closed or decommissioned for a number of reasons. In most cases, the primary purpose is to reduce road-related impacts to other resources. Roads may also be decommissioned when the access they provide is no longer needed, or to improve management efficiencies.

Figure RE-4 Subwatersheds Having High Priority for Active or Passive Restoration Boise National Forest

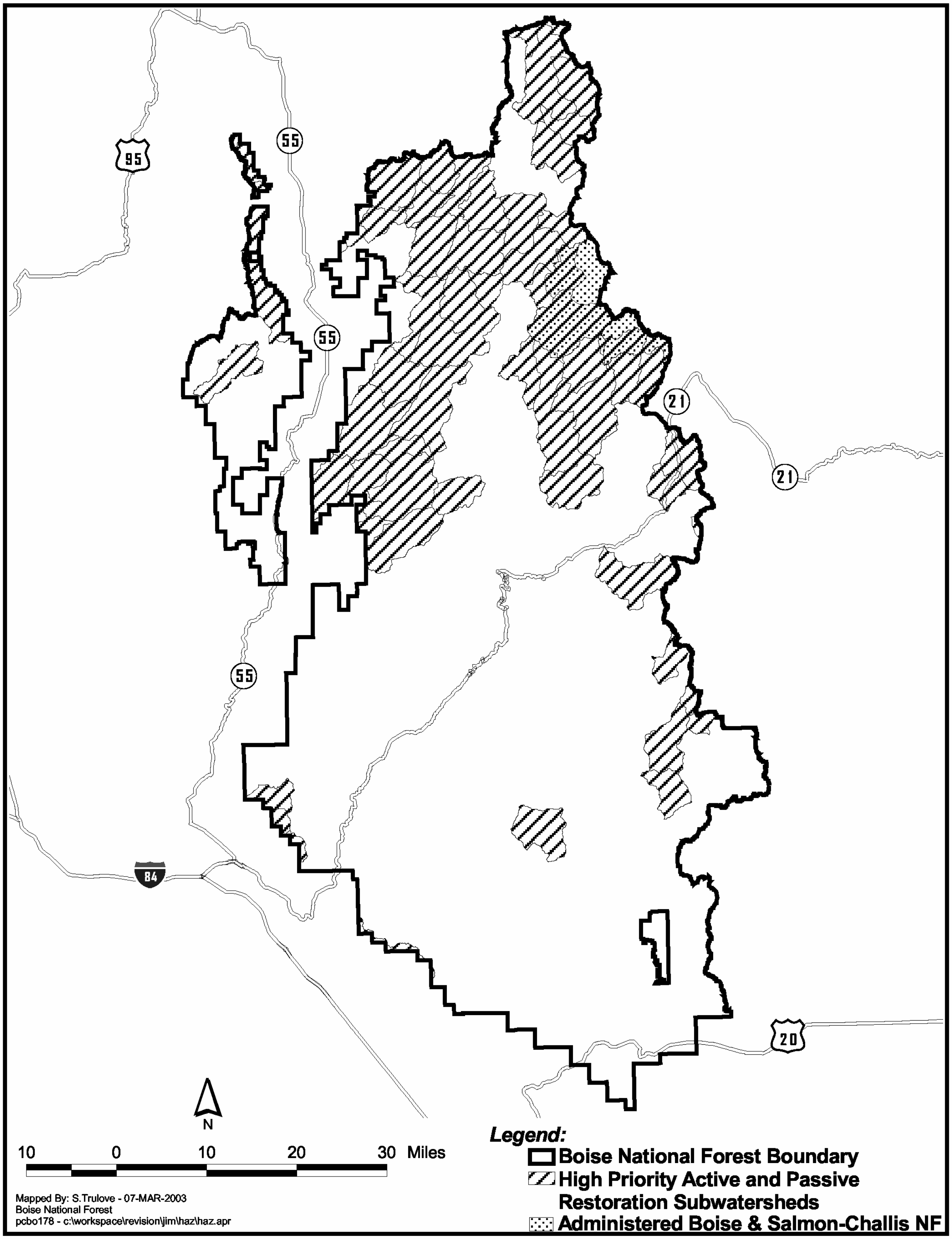


Figure RE-5 Subwatersheds Having High Priority for Active or Passive Restoration Payette National Forest

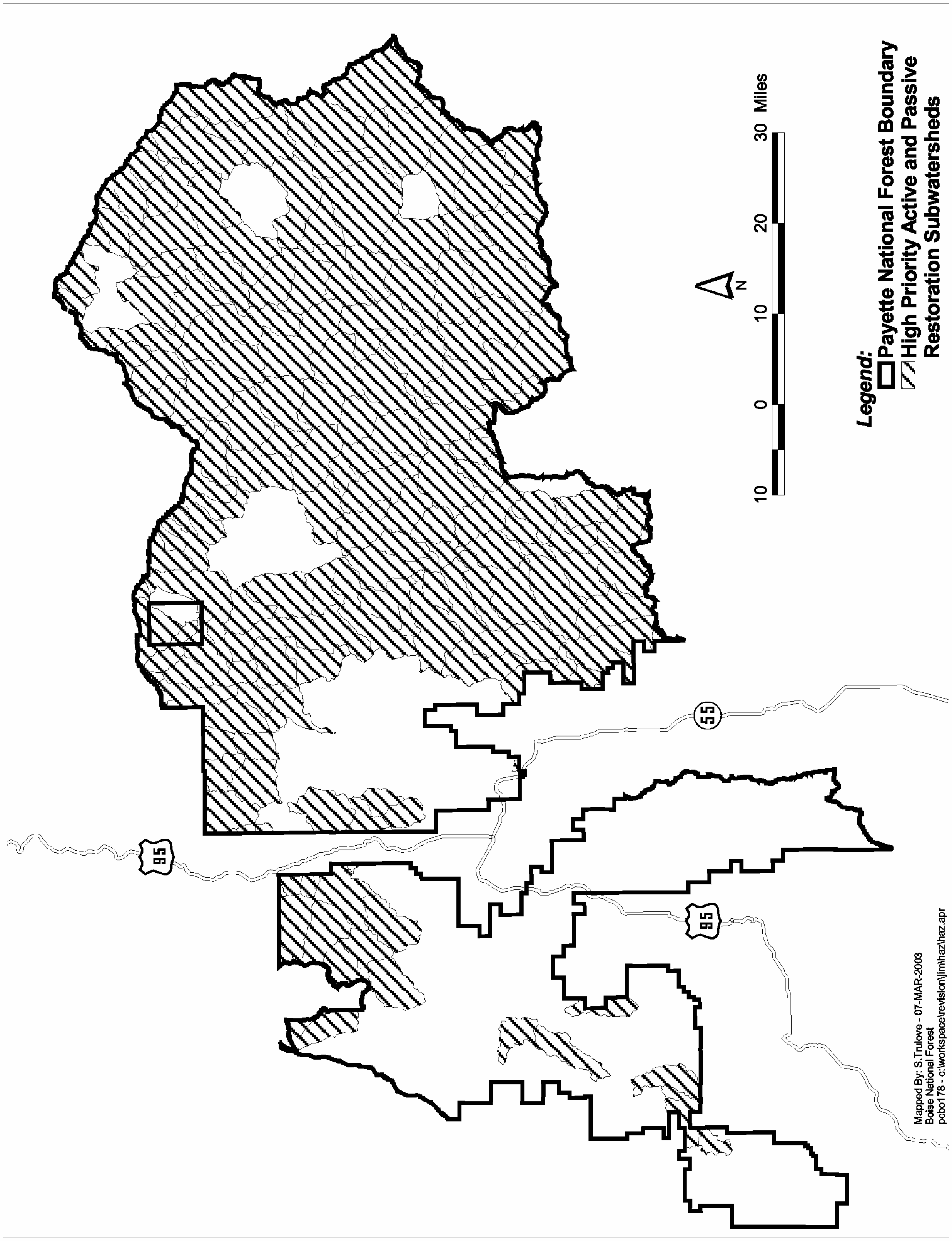
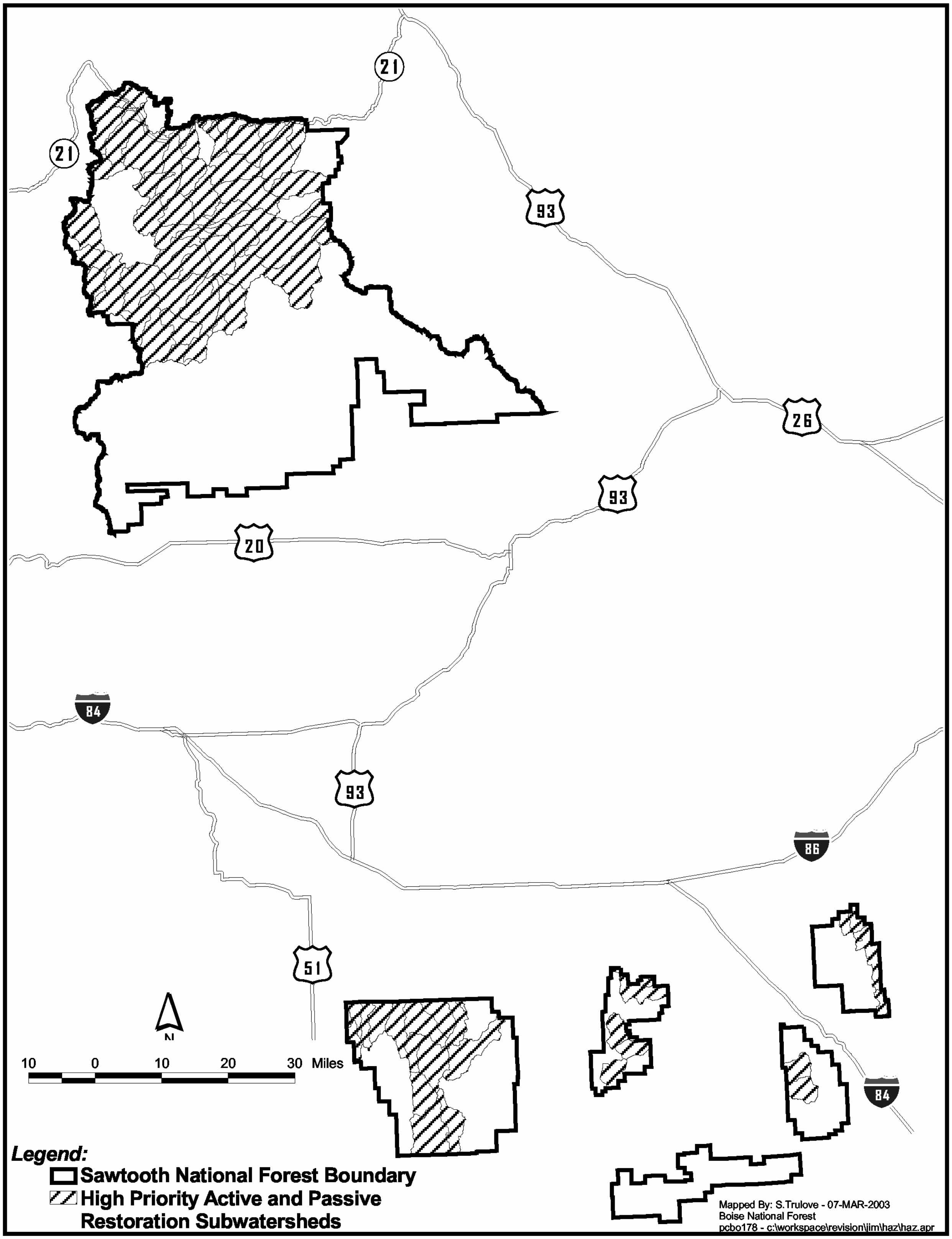


Figure RE-6 Subwatersheds Having High Priority for Active or Passive Restoration Sawtooth National Forest



A sense of the overall relative size of the road networks under each alternative can be gained from the estimates in Tables RE-18 and RE-19. These tables display the projected miles of classified roads in 2015 and the estimated miles of unclassified roads decommissioned by 2015 respectively. However, management direction and biological conditions that may lead to road closures and decommissioning can further refine that estimate. Anticipated levels of associated recreation road access would be difficult to accurately predict for each alternative because levels of open roads could also vary due to management emphasis. For example, although there might be more classified roads under Alternative 4, management emphasis associated with minimizing human disturbance may result in a lower level of open roads, with a higher level of classified road closure (maintenance level 1) and a higher level of unclassified road decommissioning.

Table RE-18. Projected Miles of Classified Roads in 2015

National Forest	Current Miles	Estimated Road Miles by Alternative						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	5,496	5,285	5,144	4,928	5,197	5,252	5,364	5,206
Payette	3,197	3,326	3,271	3,328	3,195	3,339	3,182	3,294
Sawtooth	2,019	2,024	2,013	2,008	2,018	2,030	2,019	2,016

Table RE-19. Estimated Miles of Unclassified Roads Decommissioned by 2015

National Forest	Decommissioned Unclassified Road Miles by Alternative						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	62	104	122	60	74	29	74
Payette	194	224	370	117	220	83	200
Sawtooth	37	80	118	21	47	13	68

Because the level of anticipated decommissioning exceeds the level of anticipated new road construction on the Boise, the total miles of classified roads on the Forest would decrease under all alternatives. Alternative 3 would be likely to result in the highest level of reductions of classified road access, and Alternative 6 would result in the least amount of change from the current classified road access levels. All the other alternatives would vary slightly in their classified road access reductions between those two alternatives.

On the Payette, classified road access would likely be the greatest under Alternative 5, although Alternatives 1B, 2, 3, and 7 would also be likely to expand access to varied extents. Alternatives 4 and 6 would be likely to result in relatively low levels of change in overall miles from the current system with relatively slight reductions in classified road access.

The scale of change is somewhat less for the Sawtooth than for the Boise and Payette due to its smaller road system and lower level of timber sale (i.e., new road construction) opportunities. Relatively little change to the classified road system would be expected for the Sawtooth under any alternative. The classified road system would be expected to expand slightly under

Alternatives 5 and 1B, with 5 showing the greatest increase. Conversely, it would be reduced the most under Alternative 3. Smaller reductions would be likely to occur under Alternatives 2, 4, and 7. Levels of new construction and decommissioning are expected to be about the same under Alternative 6, keeping the projected road system about the same as its current level.

Alternatives that present relatively high levels of new road construction—5, 2, and 1B—also present higher levels of potential indirect effects. Under these alternatives, the potential for new recreation access in areas that were previously less accessible could cause displacement of some users and greater levels of travel violations in areas where travel methods are restricted.

Alternative 3 would likely have the greatest effect on recreational access on unclassified roads on all three Forests. Unclassified road decommissioning is expected to be highest under that alternative. On the Boise and Payette, Alternatives 1B, 2, 4, 5, and 7 all would have moderate levels of decommissioning. On the Sawtooth, Alternatives 1B, 2, 5, and 7 all would likely result in moderate levels of decommissioning, while Alternatives 4 and 6 result in relatively low levels of decommissioning. Alternative 6 would likely result in the lowest level of unclassified road decommissioning on all three Forests and would therefore be likely to have the lowest impacts on recreational access on unclassified roads.

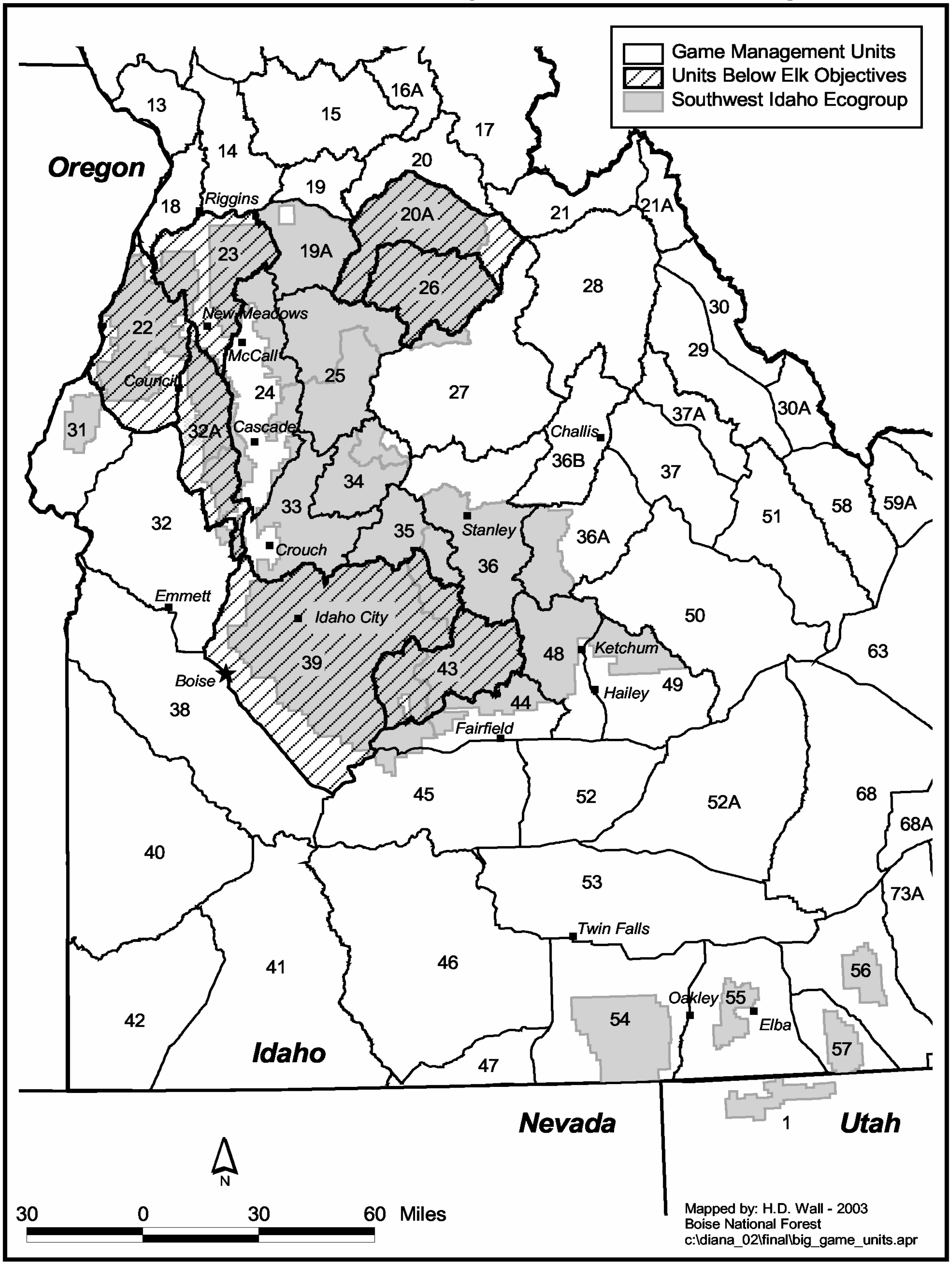
Subwatersheds that are rated as high priorities for watershed or aquatic restoration can provide a spatial sense of where road closure and decommissioning are most likely to be considered to restore aquatic conditions. These subwatersheds are displayed in Figures RE-4, RE-5, and RE-6. In other cases, road closures and decommissioning may be focused in areas that are assigned to MPC 3.2 that are also State hunting units where elk populations are below the desired objective level. A spatial sense of where road closure and decommissioning are most likely to be considered to protect elk populations may best be represented spatially by State hunting units where elk populations are below the desired objective level. These hunting units are displayed in Figure RE-7.

Motorized/Non-Motorized Recreation Conflicts

Motorized and non-motorized use determinations are made at two separate levels in Forest planning. Forest Plan management direction establishes the basis for analysis and decisions made at the site-specific level. For example, if motorized use were to be prohibited within all recommended wilderness areas, this would be done at the Forest Plan level. Decisions regarding specific trails, roads, and areas across each Forest are tiered to Forest Plan direction, but are typically made in site-specific planning processes that are conducted separately from Forest Plan revisions. Ultimately, motorized/non-motorized conflicts must be addressed at the site-specific level through review and revision of the Travel Map in a separate planning process. The revision planning process does not change the current Forest Travel Maps in and of itself. For example, if prohibiting motorized use within recommended wilderness becomes a feature in the selected Forest Plan alternative, subsequent travel management planning processes will need to analyze that action on a site-specific basis. The decisions from the travel planning processes will either implement the Forest Plan direction or amend it. As such, it is highly unlikely that most motorized/non-motorized use conflicts can be resolved in this Forest Plan revision process.

Figure RE-7.

State Hunting Units Where Elk Populations Are Below Objectives - Southwest Idaho Ecogroup



The current travel regulations serve as the base for public access under Alternatives 1B, 2, 3, 5, and 7. In order to address an issue of non-conforming uses in recommended wilderness areas, mechanical transport uses within recommended wilderness would be prohibited under Alternatives 4 and 6. This would mean that both motorized and mechanized forms of recreational access would be categorically prohibited in large areas of each of the Forests under these two alternatives. As a result, the proportion of each National Forest's lands and trails that are closed to both on- and off-trail motorized use varies by alternative. Comparing these figures for each alternative provides a sense of the relative proportions that would exist between the levels of motorized and non-motorized opportunities under each alternative. These figures are displayed in Table RE-20. This analysis only reflects the effects of programmatic decisions made in the Forest Plan revision process. It does not preclude or reflect potential site-specific travel management decisions that may be made in subsequent travel planning processes.

Table RE-20. Percent of Ecogroup Forest Areas and Trails Closed to Motorized Uses*

Type of Closure	Alternatives	Boise NF[1]	Payette NF[1]	Sawtooth NF[1]
Percent of Forest Closed to **Summer** Cross-Country Motorized Uses	1B, 2, 3, 5, & 7	76	78	63
	4	81	82	70
	6	76	78	63
Percent of Forest Closed to **Winter** Cross-Country Motorized Uses	1B, 2, 3, 5, & 7	16	53	28
	4	47	77	60
	6	24	57	38
Percent of **Summer** Trail Miles Closed to **Motorized** Uses	1B, 2, 3, 5, & 7	20	65	45
	4	52	92	69
	6	25	70	49
Percent of **Winter** Groomed Trail Miles Closed to **Motorized** Uses	1B, 2, 3, 5, & 7	4	0	26
	4	4	0	23
	6	4	0	26

* Includes any form of motorized use during all or any part of the year.

Values for Alternatives 1B, 2, 3, 5, and 7 in Table RE-20 all reflect the current travel regulations since none of those alternatives would contain programmatic management direction that would lead to changing travel regulations. The values for Alternatives 4 and 6 reflect the prohibition on all forms of mechanical transport, including motorized uses, within recommended wilderness areas. As a result, opportunities for both summer and winter motorized uses are decreased to varied extents under Alternatives 4 and 6.

Motorized cross-country travel opportunities are substantially lower in the summer than the winter. This is largely due to the fact that over-snow motorized use has a much lower level of ground disturbance than summer motorized vehicle use. As a result, winter motorized travel is generally less restricted.

During summer periods, cross-country motorized travel opportunities would be reduced by about 4 percent on the Boise and Payette and by about 7 percent on the Sawtooth under Alternative 4. Non-motorized opportunities would increase correspondingly by those same levels under Alternative 4. There would be little change in summer cross-country motorized travel opportunities under Alternative 6 because most of the area within recommended wilderness in Alternative 6 is also closed to cross-country motorized travel under the current travel regulations.

During winter periods, cross-country motorized travel opportunities would shrink under Alternative 4 by 24 to 32 percent of each Forest. These reductions reflect the fact that substantial portions of the recommended wilderness in Alternative 4 are currently open to snowmobile use. The areas offering non-motorized winter experiences would grow correspondingly under Alternative 4. Winter cross-country motorized travel opportunities would also be reduced under Alternative 6, although to a much lesser extent than Alternative 4. Under Alternative 6, winter cross-country motorized opportunity reductions would range from 4 to 10 percent of each Forest, with reductions being the greatest on the Sawtooth and the least on the Payette.

The same pattern prevails among the Alternatives for summer trail opportunities. Motorized opportunities would be reduced in levels ranging from 24 to 33 percent under Alternative 4 and from 4 to 6 percent under Alternative 6. Conversely, non-motorized opportunities would increase correspondingly under Alternatives 4 and 6.

Although the proportion of winter groomed trails that are open to motorized use seems substantially higher than non-motorized use, it must be considered that there are many more miles of groomed snowmobile trail than groomed cross-country ski trails and that the snowmobile trails are also open to skiing. It should also be considered that groomed cross-country ski trails could potentially be affected by further restrictions on motorized uses since motorized equipment is used to groom cross-country ski trails.

There would be relatively little effect on groomed snowmobile and cross-country ski trails under any of the alternatives. This is largely due to the fact that there are only a few cases where these winter trails are located within recommended wilderness and they all occur on the Sawtooth. .

In reality, there would likely be little or no effect on the cross-country ski trails that are within recommended wilderness under Alternative 4. Trails are located barely inside of recommended wilderness boundaries, running along their peripheries. Minor adjustments to recommended wilderness boundaries could be made to exclude the trails or the trails could be relocated where possible. There would likely be no loss of groomed cross-country ski trails under any alternative.

The effects on opportunities for all forms of recreational mechanized transport use under each alternative are examined in greater detail in the *Inventoried Roadless Areas* section of this chapter.

Cumulative Effects

Indicator 1 - Recreation Settings
Anticipated changes in the levels of summer and winter ROS classes were aggregated for the entire Ecogroup to provide a larger context for the potential changes to recreation settings and experiences from mechanical vegetation treatments, road construction, and changes in motorized travel regulations under each alternative. Ecogroup-scale values are displayed in Table RE-21.

Changes to recreation settings over the Ecogroup area would vary in type and degree by alternative. In the case of summer recreation settings, Alternatives 4 and 6 represent shifts from the Semi-Primitive Motorized settings to the Primitive and Semi-Primitive Non-Motorized settings, with the overall shift being about nine times larger under Alternative 4. Both of these alternatives would increase opportunities for primitive and semi-primitive recreation experiences in non-motorized settings. In so doing, they would likely contribute to the shortage of semi-primitive motorized experiences that was identified in the SCORTP. Alternative 4 would contribute to the identified shortage substantially more than Alternative 6.

Alternatives 1B, 2, 3, 5, and 7 would all be likely to reduce summer Semi-Primitive Non-Motorized settings by a range of 39,000 to 47,000 acres. Increases would likely occur predominantly in Roaded Modified settings under Alternatives 1B, 3, and 5. Under Alternatives 2 and 7, the increases would be split almost evenly between Semi-Primitive Motorized and Roaded Modified settings. Semi-Primitive Motorized settings would likely increase under Alternatives 2, 5, and 7, with the greatest increases coming with Alternative 7, making it the alternative that most responds to the SCORTP for summer recreation settings.

Table RE-21. Estimated Acres of Summer and Winter ROS Class Change by Alternative for the Ecogroup by 2018[1]

ROS Class[2]	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Summer ROS Acres							
P	0	0	0	191,000	0	41,000	0
SPNM	-34,000	-33,000	-47,000	768,000	-46,000	57,000	-29,000
SPM	-4,000	14,000	-13,000	-959,000	5,000	-98,000	16,000
RN	2,000	0	2,000	0	0	0	0
RM	32,000	19,000	53,000	0	41,000	0	14,000
R	4,000	0	4,000	0	0	0	0
Winter ROS Acres							
P	-68,000	-8,000	-68,000	173,000	-8,000	48,000	-8,000
SPNM	73,000	6,000	67,000	1,465,000	0	494,000	8,000
SPM	-12,000	-9,000	-45,000	-1,639,000	-40,000	-541,000	0
RN	-2,000	0	-2,000	0	0	0	0
RM	7,000	10,000	46,000	0	47,000	0	0
R	2,000	0	2,000	0	0	0	0

[1]Acreages are rounded to the nearest 1,000 acres. Totals may differ slightly due to rounding.
[2]ROS Class Abbreviations: P = Primitive; SPNM = Semi-Primitive Non-Motorized; SPM = Semi-Primitive Motorized; RN = Roaded Natural; RM = Roaded Modified; R = Rural.

The pattern for expected setting shifts for summer recreation under Alternatives 4 and 6 is repeated in winter recreation settings. Both of these alternatives present shifts from the Semi-Primitive Motorized settings to the Primitive and Semi-Primitive Non-Motorized settings, with the overall shift being about three times larger under Alternative 4. Both of these alternatives would contribute to the shortage of semi-primitive motorized experiences that was identified in the SCORTP.

Alternatives 1B, 3, and 5 would all present relatively moderate levels of change to winter recreation settings but in somewhat different ways. Semi-Primitive Non-Motorized, Roaded Modified, and Rural settings would likely increase, under Alternatives 1B and 3, while Primitive, Semi-Primitive Motorized, and Roaded Natural settings decrease. Under Alternative 5, roaded Modified settings would likely increase while Primitive and Semi-Primitive Motorized settings decrease. With their reductions in Semi-Primitive Motorized settings, these alternatives would all likely contribute to the identified shortage of semi-primitive motorized experiences that were identified in the SCORTP. However, this effect would be substantially less than the extent under Alternatives 4 and 6.

Alternatives 2, and 7 are similar in that the levels of change to winter recreation settings under these alternatives is likely to be relatively small with the net changes ranging only from 8,000 to 17,000 acres. Alternative 2 would likely present shifts from Primitive and Semi-Primitive Motorized settings to Semi-Primitive Non-Motorized and Roaded Modified settings. Alternative 7 presents a relatively small shift from Primitive to Semi-Primitive Non-Motorized settings. In that Alternative 7 is the only alternative that does not decrease Semi-Primitive Motorized settings, it represents the alternative that most responds to the SCORTP for winter recreation settings.

Indicator 2 - Uncharacteristic Wildfire Hazard and Fuel Reduction Activities

Anticipated levels of areas having high or extreme ratings for uncharacteristic wildfire hazard or resistance to control assigned with MPCs 5.1 or 6.1 were aggregated for the entire Ecogroup. These values, shown in Table RE-22, provide a larger context for the potential changes to recreation settings from vegetation restoration and fuel reduction treatments by alternative.

Table RE-22. Approximate Ecogroup Acres Having High or Extreme Ratings for Uncharacteristic Wildfire Hazard or Resistance to Control Assigned with MPCs 5.1 or 6.1*

Area	Alternative						
	1B	2	3	4	5	6	7
Ecogroup	694,000	1,339,000	1,811,000	570,000	958,000	534,000	925,000

* Acreages have been rounded to the nearest 1,000 acres.

For the Ecogroup as a whole, Alternative 3 would likely result in the highest potential levels of recreation use disturbance and displacement due to vegetation restoration and fuels reduction activities. This is what would be expected with this alternative’s aggressive restoration emphasis. Alternative 2 also presents a relatively high level of potential displacement, although its effects would likely be somewhat less than Alternative 3. Alternatives 7 and 5 present the next highest potential effects, with both having relatively similar levels of potential impacts. Alternative 1B also presents a relatively moderate level of potential disturbance, but somewhat less than that of Alternatives 7 and 5. Alternatives 6 and 4 result in roughly similar levels of potential restoration activities and also comprise the lowest levels of potential disturbance to recreation uses, with Alternative 6 being the lowest overall.

Indicator 3 - Aquatic, Riparian, and Watershed Restoration Activity Effects on Developed Recreation

Anticipated levels of developed recreation sites within subwatersheds having high priority for active restoration and assigned to MPC 3.2 were aggregated for the entire Ecogroup. These values provide a larger context for the relative potential effects from for aquatic, riparian, and watershed restoration activities on developed recreation facilities under each alternative. These values are displayed in Table RE-23.

Across the Ecogroup, Alternative 3 presents the greatest potential for impacts from active aquatic restoration efforts on developed recreation sites. This is what would be expected with this alternative's aggressive restoration emphasis. However, even despite its high level of potential impact, Alternative 3 represents potential effects to only about 15 percent of the total developed recreation sites within the Ecogroup. Alternatives 2, 7, and 6 also present potentials for similar, relatively high levels of impacts to developed sites. Potential impacts would likely be low under Alternative 4 and virtually none under Alternative 5. The Alternative 1B results indicate a level of no impacts, however, this may be somewhat misleading. Some level of impacts could result from site-specific analysis under any alternative. The results under Alternative 1B can be attributed to the fact that there is no management prescription similar to MPC 3.2 in the current Forest Plans. Alternative 5 presents a similar situation with its relatively low level of MPC 3.2.

Table RE-23. Ecogroup Developed Recreation Sites within Subwatersheds Having High Priority for Active Restoration and Assigned to MPC 3.2

Area	Alternative						
	1B	2	3	4	5	6	7
Ecogroup	0	95	113	31	4	84	94

Indicator 4 - Aquatic, Riparian, and Watershed Restoration Activity Effects on Dispersed Recreation

Anticipated levels of high priority restoration subwatersheds assigned to MPCs 3.1 or 3.2 were aggregated for the entire Ecogroup to provide a larger context for the relative potential effects from for aquatic, riparian, and watershed restoration activities on dispersed recreation activities under each alternative. These values are displayed in Table RE-24.

Table RE-24. Total Acres of High Priority Restoration Subwatersheds Assigned To MPCs 3.1 or 3.2*

Area	Alternative						
	1B	2	3	4	5	6	7
Ecogroup	0	669,000	1,078,000	561,000	54,000	228,000	1,087,000

* Acreages have been rounded to the nearest 1,000 acres.

Across the Ecogroup, Alternative 7 would probably present the greatest potential for restrictions or changes to dispersed recreation uses. Alternative 3 would have relatively similar results but would be slightly lower than Alternative 7. Alternatives 2, and 4 would likely result in moderate levels. Alternative 6 would have relatively smaller potential for restrictions or changes to dispersed recreation uses.

Again, the results of this analysis could be somewhat misleading in the case of Alternative 1B. This alternative results in no acres within high priority restoration subwatersheds assigned to MPCs 3.1 or 3.2. This does not mean that recreation activities would never be restricted or altered under this alternative; this situation might result from a number of circumstances during site-specific project analyses to address local recreational impacts. The results under Alternative 1B simply reflect the fact that there are no MPC 3.1 or 3.2 assignments under that alternative. However, this analysis is still valid in that the potential level of restrictions or changes to dispersed recreation uses is likely to be the lowest under Alternative 1B.

Indicators 5 and 6 - Potential Changes in Recreational Access

Anticipated levels of both projected miles of classified roads and miles of unclassified roads decommissioned by 2015 were aggregated for the entire Ecogroup. These values provide a larger context for the relative potential for effects to recreational access under each alternative. These Ecogroup-scale values are displayed in Tables RE-25 and RE-26.

Table RE-25. Projected Miles of Classified Roads in 2015

Area	Current Miles	Estimated Road Miles by Alternative						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Ecogroup	10,712	10,635	10,428	10,264	10,410	10,621	10,565	10,516

Table RE-26. Estimated Miles of Unclassified Roads Decommissioned by 2015

Area	Decommissioned Unclassified Road Miles by Alternative						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Ecogroup	293	408	610	198	341	125	342

From an Ecogroup perspective, the lowest level of a classified road system would be expected under Alternative 3. This is consistent with the aggressive restoration emphasis associated with Alternative 3. Alternatives 4 and 2 would be the next lowest alternatives with relatively similar total access levels. Alternatives 6 and 7 present moderate levels of potential recreation access by classified roads. Alternatives 1B and 5 would likely provide the highest levels of classified roads, with Alternative 1B providing the most of all alternatives. Results under Alternative 5 would be similar in scale but slightly lower.

Recreational access opportunities by unclassified roads are also expected to be the lowest under Alternative 3 because it presents the highest level of unclassified road decommissioning. Alternatives 2, 7, 5, 1B, and 4 all present more moderate levels of potential reductions in access. Alternative 6 is likely to provide the lowest level of reductions in recreational access opportunities by unclassified roads. Alternative 6 would be likely to result in the lowest level of unclassified road decommissioning across the Ecogroup, and would therefore be likely to have the lowest impacts on recreational access on unclassified roads.

Motorized/Non-Motorized Recreation Conflicts

Anticipated levels of both cross-country and trail experiences were aggregated for the entire Ecogroup to provide a larger context for the relative proportion of motorized and non-motorized opportunities under each alternative. These Ecogroup-scale values are displayed in Table RE-27.

Table RE-27. Percent of National Forest System Land and Trails Within the Ecogroup Closed to Motorized Uses*

Type of Closure	Alternatives	Ecogroup Totals[1]
Percent of Ecogroup Closed to **Summer** Cross-Country Motorized Uses	1B, 2, 3, 5, & 7	72%
	4	78%
	6	73%
Percent of Ecogroup Closed to **Winter** Cross-Country Motorized Uses	1B, 2, 3, 5, & 7	33%
	4	61%
	6	40%
Percent of **Summer** Trail Miles Closed to **Motorized** Uses	1B, 2, 3, 5, & 7	47%
	4	74%
	6	51%
Percent of **Winter** Groomed Trail Miles Closed to **Motorized** Uses	1B, 2, 3, 5, & 7	8%
	4	8%
	6	8%

* Includes any form of motorized use during all or any part of the year.

At the Ecogroup scale, there would be relatively little differences between the Alternatives regarding summer cross-country motorized opportunities, with open areas ranging from 22 to 28 percent of the Forests. Alternatives 4 and 6 represent reductions of only 6 and 1 percent of Forest areas respectively. Nonetheless, Alternatives 1B, 2, 3, 5, and 7 present current levels of summer cross-country motorized opportunities, while Alternatives 4 and 6 present slightly higher levels of non-motorized opportunities.

During winter periods, the reductions in cross-country motorized opportunities are somewhat greater than summer, especially under Alternative 4. Alternatives 4 and 6 represent reductions of 28 and 7 percent of Forest areas, respectively, in cross-country motorized opportunities.

Alternative 4 is likely to present the highest level in reductions to cross-country motorized travel opportunities during both summer and winter travel periods. As such, Alternative 4 would also present the highest levels of cross-country non-motorized travel opportunities.

Summer motorized trail opportunities shrink slightly under Alternative 6 and to a greater extent under Alternative 4. Reductions would be 27 and 4 percent of Forest areas under Alternatives 4 and 6 respectively. Alternative 4 is likely to present the highest level in reductions to summer motorized trail opportunities. Alternative 4 would present the highest levels of summer non-motorized trail opportunities.

Winter groomed trail opportunities would not vary substantially under any of the alternatives and would be likely to remain much as they exist under current travel regulations.

Other Cumulative Effects on Recreation Opportunities and Experiences

Other suppliers of non-urban recreation experiences include lands and developed facilities provided by other National Forests, the Bureau of Land Management (BLM), the National Park Service, the Idaho Department of Parks and Recreation, county government agencies, and adjacent lands of private ownership. The BLM is another major provider of non-urban recreation opportunities. BLM lands in southwest Idaho provide high quality, largely dispersed recreation opportunities associated with rivers, reservoirs, mountain bike and ATV trails, and desert canyons. Recreation managers in the BLM are currently addressing many of the same challenges as the Ecogroup, including facility maintenance backlogs, increasing recreation use, and recreation impacts to threatened and endangered species and their habitat.

State and local planners and members of the private sector recognize the importance of recreational opportunities to both the tourist industry and to the local economy. In southwest Idaho, the wood and wood products industry is entering a period of decline, with sawmill closures in Boise, Council, and Horseshoe Bend in recent years. Some local communities are turning more toward recreation tourism and are beginning to promote year-round tourism as a means of diversifying their economic base. As a result, some communities may become increasingly dependent on the recreation resources of the Ecogroup Forests to attract visitors.

Regardless of the alternative selected in this process, recreation use of the Ecogroup Forests, as well as other recreation opportunity providers in southwest Idaho, is likely to increase in the years to come. Projections for the Rocky Mountain RPA region, which contains the Ecogroup Forests, predict well above national average participation rates for camping, fishing, hunting, outdoor adventure sports, and snow and ice sports (Bowker et al. 1999). At the same time, at a national scale, access to recreation opportunities on private lands is decreasing (Bowker et al. 1999) creating greater demand on public lands to supply recreation opportunities, especially in areas in close proximity to urban areas. Both undeveloped areas and developed sites will be pushed closer toward their capacity limits. Conflict levels and resource impacts from recreation use are likely to continue to rise. Use restrictions resulting from attempts to resolve conflicts and efforts to mitigate resource impacts are also likely to increase. These effects are also likely to occur on the non-National Forest recreation providers to some extent as well.

As tourism grows and the country's population ages, there is also likely to be added demand to increase recreation on the developed side of the ROS. Demand could increase sharply for:

- Interpretive sites,
- Campgrounds of a higher development scale,
- Additional boat ramps,
- Expanded downhill and cross-country skiing facilities and trails, and
- More trails and trailhead facilities.

If more developed facilities are provided, the resultant change to the natural landscape would increase road-associated opportunities and decrease opportunities for those recreationists seeking a more primitive setting and experiences.

Scenic Environment

INTRODUCTION

The scenery visible to people visiting the Boise, Payette, and Sawtooth National Forests constitutes the scenic environment. Scenery is described as the general appearance of a place or landscape, or the features of a landscape. The visual condition varies by location and is dependent on human developments and natural features such as geology, vegetation, and landforms.

The Sawtooth, Payette, and Boise National Forests provide some of the highest quality scenic landscapes in the Intermountain West. Enjoyment of these scenic resources is an integral part of many recreation experiences, and these scenic attractions have contributed to making a number of locations on these Forests nationally recognized recreation destinations. As an example, the Sawtooth National Recreation Area was established in 1972 based on, among other things, the preservation of the high quality scenic environment as a backdrop for recreational pursuits (Public Law 92-400).

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect the scenic environment.

Background – No significant issues directly related to scenic resources were identified during scoping or the Need For Change analysis process. However, comments received on the DEIS suggested that visual impacts related to insect and disease and large-scale uncharacteristic wildfire should be considered in greater depth. Other comments were concerned with Forest-wide management direction for the scenic environment and with implementation of the Scenery Management System.

Management activities have the potential for directly, indirectly, and cumulatively affecting scenic resources through vegetation management, restoration, or development activities. These activities are related to many of the Need For Change topics, and could be implemented under any of the alternatives. Disturbance events of epidemic insect infestations and uncharacteristic wildfire events can also affect scenic resources. The potential effects on the scenic environment are analyzed in this section.

Indicators - The following indicators are used to measure effects of management activities and disturbance events on the scenic environment on the three Forests by alternative.

- *Indicator 1 - Acres of each Visual Quality Objective class*. This indicator reflects differing levels for allowable change to the scenic landscape that would be associated with each alternative.

- *Indicator 2 - Acres of change in Visual Quality Objective class from current levels*. This indicator reflects the relative change from the current allowable levels of change in scenic resources.

- *Indicator 3 - Levels of landscape-changing management activities*. Modeling estimates are used to gauge vegetation treatments and road construction and reconstruction, under each alternative, as a relative comparison of the potential change to the landscape. This indicator differs from the VQO indicators above in that, while VQOs reflect the allowable levels of change to the scenic environment, this indicator reflects the potential levels of change under each alternative based on anticipated management activity levels.

- *Indicators 4 and 5 - Uncharacteristic wildfire hazard index for forested vegetation and insect hazard index for forested vegetation*. These indicators will display the relative differences in alternatives in terms of the potential for visual changes from disturbance processes.

For the cumulative effects analysis, the above indicators are again used to display potential effects on an Ecogroup scale.

Affected Area

The affected areas for direct and indirect effects to scenic environment are the lands administered by the three National Forests in the Ecogroup. These areas represents the National Forest System lands where the scenic environment exists, and the lands where those resources could receive impacts from both management activities and disturbance events. The affected area for cumulative effects includes the lands administered by the three National Forests, and lands of other ownership both within and adjacent to these National Forest boundaries. Cumulative effects to resources on other land ownerships are addressed to lend a broader perspective to the importance of scenic resources on the Forests and to acknowledge the inter-relationships with those lands.

CURRENT CONDITIONS

The present landscape is a result of the interactions of existing vegetation and landforms on line, form, color, and texture of the viewed scenery. Visual conditions vary by location and are dependent on such influences as geology, water, vegetation, landforms, and human developments and activities. The scenic landscape is a dynamic medium and is continuously modified by both human and natural forces. Much of the landscape that comprises the three Forests has been altered by human developments and activities as well as recent disturbance events such as large-scale wildland fires. Some of these altered landscapes are not obvious to casual viewers because they still present natural-appearing landscapes. This is especially true when looking at some of the vegetation conditions that have resulted from fire exclusion and prescribed fire use. The Visual Management System is a management tool that determines scenic values and establishes allowable levels of human-caused change to the scenic environment. This system is used to plan project activities in order to keep visual impacts within varied levels of acceptable change. More details regarding the Visual Management System can be found in Chapter 1, The Visual Management System of Volume 2, National Forest Landscape Management (USDA Forest Service 1974).

Management of the scenic environment using the Visual Management System requires the determination of Visual Quality Objectives (VQOs) for all areas within the National Forests. VQOs provide the scenic yardstick used to gauge the effects of activities. The Visual Management System and VQOs are primarily responsive to management-induced changes and do not respond well to landscape changes due to disturbance elements. Accordingly changes related to such events will be discussed independently from the assessment of VQO changes. The five established classes of VQOs are Preservation, Retention, Partial Retention, Modification, and Maximum Modification, and are determined by consideration of viewer sensitivity, viewing distance zones, and inherent scenic qualities. Each VQO describes a differing degree of acceptable alteration of natural-appearing landscapes. Differences between each VQO classification are displayed in Table SE-1.

VQOs were originally inventoried using a prescribed systematic approach with criteria adapted to our specific land features and resources. The adopted VQOs were the result of decisions based on intended management outcomes and comments expressed by the public during the initial round of forest planning. The current levels of VQOs established on each Forest are displayed in Table SE-2.

Table SE-1. Visual Quality Objectives Descriptions

VQO	Description
Preservation	Allows ecological changes only. Management activities, except for very low visual impact recreation facilities, are prohibited. Applies to Wilderness areas, primitive areas, Wild River corridors, other specially classified areas, areas awaiting classification, and some unique management units that do not justify special classification.
Retention	Allows management activities that are not visually evident. Activities may only repeat form, line, color, and texture that are frequently found in the characteristic landscape. Changes in size, amount, intensity, direction, pattern, etc., should not be evident.
Partial Retention	Allows management activities that remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, and texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture that are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape.

VQO	Description
Modification	Allows management activities that may visually dominate the original characteristic landscape. However, activities of vegetative and land form alteration must borrow from naturally-established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities such as structures, roads, slash, root wads, etc., must remain visually subordinate to the proposed composition. Introduction of facilities such as buildings, signs, roads, etc., should borrow naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are compatible with the natural surroundings.
Maximum Modification	Allows management activities that may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain details that are incongruent with natural occurrences as seen in foreground or middle ground. Introduction of structures, roads, slash, root wads, etc., must remain visually subordinate to the proposed composition as viewed in the background.

Table SE-2. Acres and Percent of Visual Quality Objectives by Forest

Visual Quality Objective	Boise NF		Payette NF		Sawtooth NF		Ecogroup	
	Acres	%	Acres	%	Acres	%	Acres	%
Preservation	200,000	09	1,014,000	44	492,000	23	1,718,000	26
Retention	599,000	27	112,000	05	271,000	16	1,078,000	16
Partial Retention	1,059,000	48	568,000	25	596,000	25	2,334,000	36
Modification	258,000	12	606,000	26	555,000	26	1,200,000	18
Maximum Modification	87,000	04	0	0	197,000	09	284,000	04

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Management area goals and prescriptions have been considered together with existing scenic resources and values to produce scenic environment standards and VQOs. In most cases, the originally inventoried VQOs have been adopted as the management standard. Some have been modified to compliment unique circumstances, such as recommended wilderness, scenic byways, and Wild and Scenic Rivers. Forest Plan standards and guidelines will direct rehabilitation, enhancement of visual quality, integration of aesthetics in resource planning, and efforts to vary stand densities to create vegetation diversity. As such, they are used in project design to protect important scenic values, while allowing an acceptable level of landscape change where appropriate. VQOs are established for all areas within the Forests. The VQOs reflect sensitive areas of high visual concern as well as areas of low scenic priority. Project proposals are designed or modified to meet the established VQOs. Examples of mitigation efforts commonly used include revegetation of disturbed sites, choice of materials and colors for structures that reduce their visibility, placement of utilities underground, design of timber harvest units to blend with the natural-appearing landscape, and use of locations that provide vegetation screening.

General Effects

Scenery is an integral component of all national forest settings, and contributes to the quality of the user's experience. It has also been altered in numerous locations across the Ecogroup by both human and natural forces. Obvious and significant effects on visual resources arise from a variety of resource management activities and public uses such as logging, mining, and utility corridors that alter vegetation and landscape appearances. The relative amount of these activities and uses may, in some cases, vary by alternative. However, they are likely to be present to some extent in all alternatives.

Visual effects of management activities and disturbance events are seldom limited to the specific location of the activity or the event. As seen from a travel route or use area, such alterations can affect the visual appearance of the entire viewed landscape or "viewshed".

Restoration Activities – These activities may include timber harvest, road construction, reconstruction, and decommissioning, prescribed fire, facility relocation and modification, fish habitat improvement, streambank stabilization, slope stabilization, and mining reclamation. Their effects are described in greater detail below.

Timber Harvest - Effects can vary depending upon the quantity and type of timber removed, logging methods, and the setting. Generally, timber removal—and any associated roads, skid trails and slash treatments—results in adverse effects to the scenic environment arising from vegetation change or removal and ground disturbance. These impacts are usually the most dramatic in areas where no visible evidence of human development activities has previously occurred. Thinnings and selection harvests usually have lower impacts and are also evident for a shorter duration than overstory removals, shelterwood harvests, and clearcuts. Helicopter logging does not create skid trails or yarding corridors that contribute to the visual impacts of ground-based and cable logging systems. Timber management may also be used to improve scenic quality, particularly where there are opportunities to enhance scenic views, to provide a landscape associated with the public's expectation, and to achieve timber stand characteristics that are more visually appealing.

Roads and Trails - Construction, reconstruction, and decommissioning can all affect the scenic environment. Road construction and reconstruction are usually associated with timber harvest, facility development, utility corridors, telecommunications sites, mineral and energy development, and recreation activities. Roads and trails create a long-term visual impression on the landscape from associated vegetation clearing and ground disturbance activities. These effects are usually magnified by the linear nature of the pattern of disturbance, especially in forested landscapes. The extent of the impact depends upon topography, service type, soils, geology, and the nature of surrounding vegetation. The visual impact from trails is usually somewhat less due to their smaller width, which reduces the level of ground disturbance and makes impacts easier to mitigate in most cases. Road and trail decommissioning includes a variety of management actions ranging from simple closures to complete obliteration. Obliteration can often eliminate the visual impacts of a road or trail over the long term as vegetation matures in former road or trail locations; however, temporary or short-term effects of ground disturbance are often greater than closures.

Mineral and Energy Exploration, Development, and Reclamation – Exploration and development activities can result in both short-term and long-term effects from associated structures, vegetation clearing, and ground disturbance activities. The effects on scenic resources vary depending largely on the scale and location of development. Small scale developments of a few acres, or underground mining, would have very limited impacts, while large scale surface mining operations typically have major effects on the scenic quality of the surrounding area. Mining reclamation activities can also result in temporary or short-term effects to the scenic environment, but these effects are generally no worse than the conditions being reclaimed, and reclamation results in long-term improvement to the visual landscape. In that the level of mineral exploration and development is largely driven by market forces and regulated by existing mining law, there would be little difference between the alternatives in effects on the scenic environment. Reclamation activities may vary depending on differences in alternative restoration emphasis.

Facilities and Structures – These include a broad array of physical developments and structures, such as administrative facilities, dams and diversions authorized under special use authorizations, and mining facilities. Usually, there are both short-term and long-term visual effects from structures, vegetation clearing, and ground disturbance activities. These effects vary depending on the scale and nature of the development, as well as the setting. Road construction for installation and/or maintenance purposes can contribute to the impacts of the facility.

Utility Developments – These developments include pipelines and overhead powerline clearings that can result in both short-term and long-term effects from associated permanent structures, reflective materials, vegetation clearing, and ground-disturbance activities. These effects are usually magnified by the linear nature of the pattern of disturbance, especially in forested landscapes. Road construction for installation and/or maintenance purposes often contributes to the impacts of the utility line. Corridors for anticipated utility line needs are described in the Management Area sections of the Forest Plan. Site-specific analysis would be required prior to approval or implementation of any utility corridor development.

Telecommunications Sites - Communications developments can result in short and long-term effects from associated permanent structures, vegetation clearing, and ground disturbance activities. These effects are usually localized at individual sites that cover five acres or less in size. However, communication sites often must be located on highly visible peaks or along well-traveled corridors that make mitigation of visual impacts difficult if not impossible. Road construction for installation and/or maintenance purposes can contribute to the impacts of the telecommunication site. Site-specific analysis would be required prior to approval or implementation of any telecommunication site development.

Recreation - Activities can result in impacts to the scenic environment depending on recreation activity levels, and soil and vegetation types. Off-road and off-trail travel and dispersed camping can cause erosion, ground disturbance, or de-vegetation. Although all forms of travel have the potential to cause these types of impacts, effects associated with most forms of motorized travel are usually the most pronounced due to the combination of vehicle weights, widths, and their creation of continuous track lines. In snow-covered landscapes, high numbers of snowmobile or ski tracks across a scenic view can also result in a temporary visual impact.

In addition to the visible effects of activities, recreation developments can contribute to the loss of natural-appearing landscape character by introducing numerous vehicles, groups of buildings, and conspicuous structures. As with other structures and facilities, the effects range from short to long term in duration and can vary depending on the scale and nature of the development, as well as the setting.

Scenic Byways – Five state and one federally designated Scenic Byways cross National Forest System lands within the Ecogroup. This designation is an indicator that scenic resources along these routes are especially attractive and important to the public. VQOs for these corridors will reflect the heightened importance and provide sufficient protection to maintain their high scenic values.

Sawtooth National Recreation Area – The law that established the SNRA in 1972 emphasized preservation of the visual resource as a backdrop for recreational pursuits. This law limits developments within the SNRA to ones that do not have detrimental effects to scenic values. This constraint does not vary and is present in every alternative.

Range Management - Livestock grazing and range improvements may result in an altered landscape appearance. Changes to the landscape appearance may include differences in the type and amount of vegetation on the land, vegetation trampling, and range improvement structures. Effects from grazing depend largely on the intensity and timing of forage utilization. Normally, allotment management plans require permittees to move their livestock so that they do not concentrate in sensitive areas, like meadows and riparian areas. Although there could be effects from seasonal trampling and heavy utilization of the forage, the potential for change to the scenic environment is relatively slight. However, long-term conversion of plant communities is known to have occurred and, in some instances, has been heavily influenced by management activities. Structural improvements, such as fences, may be visually evident and can detract from the natural-appearing landscape character. Mitigation may include relocating or redesigning fences where possible, or removing them where they are no longer needed. Generally, improvements are small and localized, and have a minor effect on the scenic quality of the surrounding area.

Watershed Improvements - A broad array of physical alterations may include streambank stabilization structures (rock gabions, rock riprap, etc.), road reconstruction (culvert replacements, road re-alignment, etc.), slope stabilization structures, and re-vegetation planting. Some structural improvements such as contour trenches, directionally felled trees in burned areas, and sequential check dams and gully plugs can be visually evident and can detract from the natural-appearing landscape character. Duration of effects from these types of structures range from short term to long term and also depend on the scale of the structures themselves. Generally, most improvements are relatively small and localized, and have a minor effect on the scenic quality of the surrounding area.

Fish and Wildlife Habitat Improvements - A broad array of physical alterations may include vegetation manipulations (stand, structure, and composition cuts, browse species plantings, etc.), prescribed burning, and habitat improvement structures. Some structural improvements may be visually evident and can detract from the visual landscape, but are infrequently used. Others may be designed to improve the scenic environment over time. Negative impacts may be mitigated through design and location considerations, and vegetative cover plantings where possible. Generally, improvements are small and localized, and have a minor effect on the scenic quality of the surrounding area.

Disturbance Events – Scenic resources comprise a dynamic environment. Changes to scenery will occur with or without human activity. Wildland fire, insects, disease, landslides, and other disturbances can greatly affect scenic resources, especially when the scale of these events is large.

Insect and disease outbreaks can result in large areas of dead trees. Stands of predominantly dead trees can then become fire hazards, for a period of time, indirectly increasing the potential for wildfire effects to scenic resources. In some cases, salvage logging is used to capture economic value in large areas of tree mortality, but additional or different visual long-term impacts may occur from new roads and salvage harvest units.

Effects on scenic resources from wildland fire vary depending upon a number of factors. The visual effects from an individual fire depend upon the severity, intensity, and magnitude or scale of the fire. A low to moderate intensity fire of mixed severity can result in a vegetation mosaic across the landscape producing a long-term positive visual benefit by increasing the diversity of vegetative species, structure, size and age classes, snags, and coarse woody debris. On the other hand, large-scale burning, ground scorching, and tree and shrub mortality can alter the scenic values associated within an area and reduce the inherent visual complexity and scenic values of a landscape. The large-scale loss of vegetation can have short-term negative impacts from burned landscapes, as well as long-term impacts in the form of a more simplified landscape mosaic. Additionally, many people find burned landscapes visually unappealing and unattractive. Uncharacteristic fires that burn with uniformly high intensity and severity across large areas have the greatest impacts on visual resources and are long term in duration. Wildland fire usually also results in temporary visibility impairment from smoke. Smoke from fires can partially or completely obscure the high-value scenic attractions that characterize much of the Ecogroup area.

In areas where disturbance events dominate the landscape, the potential for dramatic visual effects is likely to substantially increase over the long term. It is difficult to predict how or where or when these changes might occur due to influential variables such as vegetation patterns, disturbance regimes, climate, and topography.

Wildfire Suppression – Fire suppression activities produce effects to the scenic environment both directly and indirectly. Some firefighting activities, such as mechanical fire line and safety zone construction, can result in direct, long-term effects from vegetation clearing and ground disturbance. In the case of fire line construction, these effects are usually magnified by the linear nature of the pattern of disturbance. In some vegetation types, fire suppression can and has produced vegetative conditions that would not be present had fire occurred at historical levels. Fire exclusion has allowed some late seral or climax forest cover types, such as Douglas fir, to dominate the visual landscape in some locations for longer time periods than they would without excluding fire. To some extent, this has resulted in landscapes with less visual diversity than what would be present in the absence of fire suppression.

Prescribed Fire – Prescribed fire can result in temporary visibility impairment from smoke. Smoke from fires can partially or completely obscure the high value scenic attractions that characterize much of the Ecogroup. Prescribed fires usually also result in both short-term and long-term visual effects in the form of landscapes having burned appearances. In many cases, fires are designed to mimic historical fires in post-fire appearance over time. However, many people find the post-fire appearance of burned vegetation to be unattractive. Prescribed fire is generally used in areas comprised of vegetation characterized by non-lethal or mixed1 fire regimes to reduce ladder fuels and restore or maintain desired vegetative conditions. In these circumstances, fire intensity, severity, and scale are generally lower and smaller, and result in less visual impacts of shorter duration than wildland fire events. In some cases, fire may be used to improve scenic quality. For instance, fire can be used to reduce slash or to achieve timber stand characteristics that are more visually appealing, such as open stands of large trees.

Direct and Indirect Effects by Alternative

Indicators 1 and 2 - Changes In Visual Quality Objectives

Each of the alternatives has the potential to maintain, alter, or enhance the scenic character of the Forest landscapes to varying degrees. Projects implemented on each Forest under any alternative would require a site-specific assessment of their potential impacts on the scenic environment. The Visual Management System, which is used to develop VQOs, is based on the concept that a natural-appearing landscape character is preferred. As such, VQOs reflect the threshold of the greatest acceptable deviation from a natural appearance. The VQOs are used to design management activities so that an individual project does not exceed the established threshold of change to the scenic environment.

In general, VQOs are established from consideration of the combination of scenic values, human sensitivities, and the needs for management of other resources. All of these factors vary by location across the Ecogroup, which results in varied levels of each VQO class for each Forest. VQOs can constrain management activities to protect scenic resources. In some cases, management decisions are made that constrain activities to levels below those allowed by established VQOs to protect other resource values. This is a benefit to scenic resources in that it is always acceptable to retain more of the natural-appearing landscape character.

One method of estimating each alternative's potential for changing the scenic environment is to compare anticipated acreages of each VQO class in each alternative. Individual projects are tailored to fit the

VQOs established in the Forest Plans. Once established, the VQOs become a fixed obligation or criteria for project level performance and must be constraining enough to limit changes to the visual landscape to an acceptable level. At the same time, VQOs must also be consistent with the attainment of the established multi-resource goals and objectives stated in the Forest Plan. In that management emphasis, direction, and activities are likely to vary according to assigned management prescriptions associated with each alternative; VQOs would also need to vary to some extent by alternative. For example, VQOs for a commodity-driven management scenario would need to reflect higher thresholds for the greatest acceptable deviation from the natural-appearing landscape than one for a scenario focused on preserving a natural-appearing environment.

The acreage totals for each VQO were estimated for each alternative considering the assigned management emphasis and are displayed in Table SE-3. The potential for change in the scenic environment is reflected in the proportion of the VQO classes associated with each alternative. The anticipated VQOs for each action alternative can also be compared with those of Alternative 1B to reflect the extent to which each varies from the current VQOs. These figures are also displayed in Table SE-3.

Table SE-3. Anticipated Acres* of VQO and Acres of Change by Alternative
(*Measured in thousands of acres)

Alt.	Preservation		Retention		Partial Retention		Modification		Maximum Modification	
	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing
Boise National Forest										
1B	200	0	599	0	1,059	0	258	0	87	0
2	200	0	280	-319	1,104	45	501	243	118	31
3	200	0	280	-319	1,104	45	501	243	118	31
4	746	546	254	-345	893	-166	232	-26	78	-9
5	21	-179	264	-335	1,203	144	590	332	125	38
6	200	0	281	-318	1,363	304	282	24	77	-10
7	200	0	239	-360	1,105	46	541	283	118	31
Payette National Forest										
1B	1,013	0	112	0	568	0	607	0	0	0
2	1,028	15	316	204	514	-54	442	-165	0	0
3	1,028	15	316	204	514	-54	442	-165	0	0
4	1,668	655	93	-19	243	-325	296	-311	0	0
5	802	-211	390	278	628	60	480	-127	0	0
6	1,013	0	339	227	690	122	258	-349	0	0
7	1,013	0	338	226	670	102	279	-328	0	0
Sawtooth National Forest										
1B	492	0	271	0	596	0	555	0	197	0

Alt.	Preservation		Retention		Partial Retention		Modification		Maximum Modification	
	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing
2	492	0	271	0	596	0	555	0	197	0
3	492	0	271	0	596	0	555	0	197	0
4	1,147	655	142	-129	293	-303	347	-208	182	-15
5	218	-274	372	101	720	124	604	49	197	0
6	492	0	271	0	989	393	214	-341	145	-52
7	492	0	271	0	596	0	555	0	197	0

On a Forest-wide basis, changes in the appearance of the landscape as a result of VQO shifts would take place over time because implementation of projects would not happen all at once. Landscape changes occurring from disturbances would also accrue gradually over a period of a number of years and would be heavily influenced by climate trends and individual weather events. While some viewsheds are likely to have significant alterations over the next decade, others may not be altered or altered only lightly for several decades. The duration of the visual effects would generally be both short and long-term, but could also vary depending on the nature of the management activity or development.

As noted above, VQOs are used to limit human-caused changes that reduce natural-appearing landscape character. In some cases, all viewers may not desire a natural appearance. Disturbance events, such as wildland fire, can create dramatic changes to the landscape, such as stands of burned, dead trees that may be objectionable to some viewers. However, the view they present is still considered “natural” and would meet a VQO of preservation. Levels of potential scenic resource change due to disturbance events also vary by alternative and must be considered in combination with human-caused change to understand the full potential effects offered under each alternative.

Some effects relationships are consistent across the Ecogroup area. Alternative 4 presents the greatest shift towards preservation of all the alternatives because of its elevated levels of recommended wilderness. Alternative 4 also shows a large net decrease in acres of modification or maximum modification on all three Forests. Under the VQO of preservation, human-induced landscape changes are prohibited, allowing only disturbance events to create landscape changes. Landscapes with noticeable human-induced alterations would be relatively low, with low levels of timber harvest and road construction. This alternative does have lower hazard ratings for uncharacteristic wildfires on all three Forests. This, combined with the high levels of VQOs, would result in an alternative that maintains a very high level of scenic quality.

Alternative 6 has a large shift of VQO acres from modification to partial retention. This shift is a reflection of the development limiting management direction in Alternative 6. Management direction under Alternative 6 requires that Inventoried Roadless Areas remain undeveloped and allow very limited potential development in unroaded areas. This, in combination with recommended and existing

Wilderness Areas, create large areas of natural-appearing landscape. It is also likely that the VQOs in the Inventoried Roadless Areas and unroaded areas would allow greater levels of change than what management activities are likely to create. Thus, considerably less human-caused change than what the VQOs would permit would occur over much of the Ecogroup area under this alternative. Alternative 6 has the least amount of VQOs of modification and maximum modification that allow strong or dominant changes in the landscape from management activities.

On the Boise and Sawtooth, Alternative 5 would allow the highest level of human-caused change to occur to the scenic environment, while maintaining the lowest levels of preservation VQOs on all three Forests. With its emphasis on commodity production and related developments, landscapes altered by human activity are likely to be most noticeable under this alternative. Timber harvest, new road construction and reconstruction, and livestock grazing would be relatively high. The high levels of commodity production would result in an alternative that would likely display high amounts of human-caused changes in the landscape.

Boise National Forest - On the Boise, all alternatives, except Alternative 4 would have more acres of modification or maximum modification than the current plan. Also, compared to the alternative representing the current plan (1B), all other alternatives have fewer acres of the retention VQO. The primary reason for this shift is that Alternative 1B has considerable acreage that was assigned an undeveloped recreation prescription that was allocated to a retention VQO. In all other alternatives these areas were assigned various mixes of VQOs depending upon the assigned MPCs. Alternative 5 has the least of amount of VQOs that allow for ecological changes only or subtle changes due to management activities. Alternative 5 also has the most amounts of modification and maximum modification VQOs. As a result it is anticipated that Alternative 5 would be likely to display the most noticeable and dominant changes in the landscape. The mix of VQOs assigned to Alternatives 2, 3, 6, and 7 is fairly consistent. They all allow greater amounts of landscape change than the current plan alternative. Adverse impacts to scenic resources would range from short term, such as those of fire use in grass and shrub vegetation types, to long term, such as road construction and regeneration timber harvests.

Payette National Forest – All action alternatives reduce the amount of modification VQO and almost all action alternatives increase the amount of VQOs over Alternative 1B that maintain high levels of scenic quality (retention and preservation). Alternative 5 is the exception in the case of preservation and Alternative 4 is the exception in the case of retention. Alternatives 2, 3, 6, and 7 are similar in that they increase the amount of retention roughly three-fold. Alternative 5 has the least amount of preservation but does have the most acres of retention. None of the alternatives have any maximum modification VQO assigned. Compared to Alternative 1B, all alternatives reflect a shift towards more restrictive VQOs that allow for more subtle landscape changes, with fewer areas allowing landscape alterations that dominate the viewsheds.

Sawtooth National Forest - The Sawtooth has a limited capacity for change due to the fact that maintaining law mandates a high level of visual quality for the Sawtooth NRA. VQOs in Alternatives 2, 3, and 7 have little to no variance from the current VQOs. Alternative 4 would maintain the highest levels of visual quality, while Alternative 5 would allow the most change. Alternative 5 displays the greatest shift in VQO acres due to a lack of recommended wilderness that results in acres of preservation VQOs being shifted to retention, partial retention, and modification.

Indicator 3 - Activities Affecting The Scenic Environment

Some of the alternatives present considerable differences in the amounts and types of activities that would occur across the landscape. Some activities would have relatively minor potential to cause noticeable change in the landscape, while others are likely to cause very noticeable changes. The actual social impact of such changes in the landscape will vary according to the visibility of activities, the surrounding landscape setting, and the visual sensitivity of the travel route or use area from which the activity might be viewed. The assignment of various visual quality objectives may control the magnitude and intensity of such changes permitted across the landscape in some areas. While in other areas, other factors such as the presence of Threatened and Endangered species or high levels of water quality concern may play an even greater role in controlling the magnitude and intensity of changes to the landscape.

While the specific effect of an individual activity is dependent on many site-specific variables, the overall amount of various activities can be used as a gross indicator of the overall changes that would occur across the landscape and how those would vary by alternatives. Alternatives with greater amounts of mechanical vegetation treatments and road construction would, as a general rule, result in landscape settings that appear more manipulated or altered by other than ecological processes.

Groupings of similar activities for tracking such potential changes by alternatives were made in order to simplify and capture those activities that have the most potential for affecting change on the landscape. Six different activity groupings were made:

- *Even-Aged Regeneration Harvest* - This activity grouping consists of clearcut with reserve trees, reserve tree regeneration, and shelterwood harvests. These activities have the greatest potential of all vegetation treatments to create very noticeable long-term changes in the forested landscape from the removal of substantial portions of the forested canopy.

- *Intermediate Vegetation Treatments* - This grouping consists of commercial thinning, selection harvest, and pre-commercial thinning. While there is a wide range of potential effects due to the variability in the intensity of tree removal, generally the change is subtle and does not dominate the landscape. Temporary visual effects generally would occur from ground disturbance and potential logging residue from harvest operations. Short- and long-term visual effects would occur from the reduction in forested cover density and a more open forested appearance. In some vegetation types, such as the dry Ponderosa pine stands, intermediate treatments may result in more open, park-like stands characterized by large trees with greatly reduced understories. These vegetation treatments are likely to have much lower visual impacts than even-aged regeneration harvest treatments.

- *Fire Use* - This activity consists of using prescribed and wildland fire for achieving various management goals. Visual impacts can vary considerably with the magnitude and intensity of the fire. The effects are often dominant on the landscape immediately following the activity and for a few following years. With accelerated regrowth of herbaceous and understory vegetation, the major visual effects are usually temporary or short term. Often these effects may be perceived as resulting from the natural occurrence of fire in the landscape. Long-term visual effects are subtler, resulting in more open stand conditions, again depending on the intensity of the fire. As noted above under *General Effects*, fire intensity, severity, and scale are generally lower and smaller in prescribed fire than in wildland fire. As a result, prescribed fires usually produce visual impacts of shorter duration and reduced severity than uncharacteristic wildfire events and characteristic wildfire events in lethal fire regimes. This is also true of wildland fire use although it may be to a lesser extent than prescribed fire. Wildland fire use will also generally occur under prescribed conditions that will limit intensity, duration, and severity to acceptable levels. In most cases, wildland fire will not be used during extremely dry, burning season peaks when burning intensities and severity would be at their worst. However, the effects of wildland fire use may be similar to wildfire in characteristically lethal vegetation types, such as lodgepole pine.

- *Road Construction* – The building of new roads has the potential to create very noticeable long-term alterations in natural-appearing landscape character. A number of site-specific variables such as elevation changes and cross slopes can influence the degree of impact, but typically road construction produces long narrow openings through vegetation that do not appear natural. Although vegetation regrowth may occur on road cut and fill slopes over time, the road prism and associated infrastructure remain highly visible indefinitely.

- *Road Reconstruction* – The Forest Service implements a wide variety of existing road improvement activities under the category of reconstruction. The visual impacts of these activities vary considerably. Partial road relocation, for example, would have long-term impacts similar to road construction. Road widening can also have long-term impacts, though typically not as noticeable as relocation. Other activities — such as bridge repair, culvert replacement, or road graveling — may have minor and temporary visual impacts during implementation, but can also be designed to improve the immediate scenic environment for road users over the long term.

- *Road Decommissioning* - There may also be opportunities to reduce visual impacts on the landscape through activities that decrease the effects of existing development. One such activity that has that potential, and that has been analyzed for revision, is road decommissioning. Although decommissioning can range from road closures to complete road obliteration and restoration, all activities would generally allow for some revegetation to occur along road prisms and cut and fill slopes. This revegetation would reduce the visual impact of existing road openings. Usually the visual benefit from road decommissioning is a long-term benefit that increases in effectiveness over time as vegetation is re-established.

Alternative Comparison by Forest – Management Activity Groupings - All numbers in Tables SE-4, SE-5, and SE-6 are estimates from SPECTRUM modeling of levels of activities that could occur given budget and management constraints (see Appendix B for modeling assumptions and application). These numbers can be used for the relative comparison of alternatives, but are not intended to represent actual acres or miles of projected activities.

Boise National Forest **-** Table SE-4 compares activities by alternative that would likely affect visual quality on the Boise National Forest over the next two decades, using annual averages from the model.

Alternatives 3 and 4 would have the least amount of even-aged regeneration harvest over the next two decades, followed in ascending order by Alternatives 6, 2, 7, 1B, and 5. Alternative 4 would have the least amount of intermediate treatments, followed in ascending order by Alternatives 6, 1B, 7, 5, 2, and 3. Alternative 5 would have the least amount of fire use acres, followed in ascending order by Alternatives 1B, 3, 7, 2, 4, and 6. Alternative 6 would have the least amount of road construction, followed in ascending order by Alternatives 4, 3 and 7, 1B, 5, and 2. Alternative 4 would have the least amount of road reconstruction activities, followed in ascending order by Alternatives 6, 3, 7, 1B, 2, and 5.

Table SE-4. Activities by Alternative - Boise National Forest
(Annual averages of acres or miles for the first two decades)

Activity Group	Activity Acres or Miles						
	Alt 1B	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Acres of even-aged harvest	3,790	350	0	0	4,070	20	1,580
Acres of intermediate treatment	6,440	10,595	13,240	4,155	9,500	4,325	8,870
Acres of fire use	6,995	10,880	8,800	16,135	2,780	16,325	9,610
Miles of road construction	10.8	18.3	9.8	3.0	13.6	2.5	10.2
Miles of road reconstruction	50.3	57.9	48.5	13.8	64.9	18.1	49.5
Miles of road decommissioning	31.8	53.4	62.9	30.6	38.1	14.9	38.2

Overall ranking of the alternatives relative to potential impacts to scenic resources is complicated by the fact that the potential effects are not the same for each activity group. The visual effects of intermediate treatments cannot be considered on an equal basis with even-aged regeneration harvests and road construction. The visual effects of even-aged regeneration harvests and road construction are likely to be obvious and long term. Intermediate treatments are likely to be subtler in appearance and more short term in duration. Similarly, the effects of the fire use treatments would generally be much shorter in duration than those of even-aged regeneration harvests and road construction and cannot be considered on an equal basis for potential effects. The alternatives presenting the highest levels of potential visual effects are likely to be the ones that present the highest levels of even-aged regeneration harvest and road construction.

It should also be noted that this analysis is not spatial and does not consider potential mitigations that might be possible for actual implementation. Some of the treatments and road construction are likely to occur in areas with low visual sensitivity or areas that allow vegetative or topographic screening techniques, which can greatly reduce visual impacts. Since mitigation potential is determined spatially, on a site-specific basis, it cannot be predicted and considered in a programmatic analysis.

With the highest levels of even-aged regeneration harvest, road construction, and road reconstruction, Alternative 5 would likely have the greatest long-term changes to the landscape on the Boise National Forest. Alternative 1B would have almost as high a level of long-term landscape changes as Alternative 5. Alternative 7 would probably result in fewer long-term impacts than Alternatives 5 and 1B although it would have substantially more impacts than any of the remaining alternatives. Alternatives 6 and 4 would produce the highest levels of short-term impacts from prescribed fire and wildland fire use treatments. However, these effects might be offset to some extent, by reductions in the risk of large, uncharacteristic wildfires, which could create somewhat more severe visual impacts than those of prescribed fire and wildland fire use. Overall, Alternative 4 would be likely to produce the lowest level of vegetation-impacts to the scenic environment. Alternatives 2 and 3 would likely result in moderate levels of both short and long-term impacts.

Payette National Forest - Table SE-5 compares activities by alternative that would likely affect visual quality on the Payette Forest over the next two decades, using annual averages from the SPECTRUM model.

Table SE-5. Activities by Alternative - Payette National Forest
(Annual averages of acres or for the first two decades)

Activity Group	Activity Acres or Miles						
	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of even-aged harvest	2,010	55	65	0	2,720	35	950
Acres of intermediate treatment	4,685	5,275	6,865	1,510	4,625	2,590	4,740
Acres of fire use	6,995	8,490	7,135	13,370	3,825	12,340	8,100
Miles of road construction	13.8	10.2	10.6	2.2	15.4	0.5	11.5
Miles of road reconstruction	48.4	36.4	38.7	7.5	54.5	14.7	40.6
Miles of road decommissioning	18.8	21.8	35.9	11.4	21.4	8.1	19.4

On the Payette National Forest, Alternative 4 would have the least amount of even-aged regeneration harvest over the next two decades, followed in ascending order by Alternatives 6, 2, 3, 7, 1B, and 5. Alternative 4 would also have the least amount of intermediate treatments, followed in ascending order by Alternatives 6, 5, 1B, 7, 2, and 3. Alternative 5 would have the least amount of fire use acres, followed in ascending order by Alternatives 1B, 3, 7, 2, 6, and 4. Alternative 6 would have the least amount of road construction, followed in ascending order by Alternatives 4, 2, 3, 7, 1B, and 5. Alternative 4 would have the least amount of road reconstruction activities, followed in ascending order by Alternatives 6, 2, 3, 7, 1B, and 5.

Alternative 5 would be likely to have the greatest long-term changes to the landscape on the Payette National Forest as well. Again, this would result from having the highest levels of even-aged regeneration harvest, road construction, and road reconstruction of any of the alternatives. Alternatives 1B and 7 would probably have less long-term impacts than Alternative 5, although they would have substantially more impacts than any of the remaining alternatives. Alternatives 6 and 4 would produce the highest levels of short-term impacts from prescribed fire and wildland fire use treatments. However, these effects might be offset to some extent by reductions in the risk of large uncharacteristic wildfires, which could create somewhat more severe visual impacts than those of prescribed fire and wildland fire use. Overall, Alternative 4 would likely produce the lowest level of vegetation-impacts to the scenic environment. Alternatives 2 and 3 would likely result in moderate levels of both short and long-term impacts.

Sawtooth National Forest - Table SE-6 compares activities by alternative that would likely affect visual quality on the Sawtooth Forest over the next two decades, using annual averages from the SPECTRUM model.

Table SE-6. Activities by Alternative - Sawtooth National Forest
(Annual averages of acres or miles for the first two decades)

Activity Group	Activity Acres or Miles						
	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of even-aged harvest	660	195	0	0	740	0	480
Acres of intermediate treatment	430	1,570	2,365	410	625	270	1,500
Acres of fire use	700	5,470	4,140	3,765	785	4,755	5,940
Miles of road construction	0.9	0.7	0.8	0.2	1.5	0.2	0.7
Miles of road reconstruction	3.3	3.5	4.6	1.0	5.0	0.6	3.4
Miles of road decommissioning	3.4	7.3	10.7	1.9	4.3	1.2	6.2

On the Sawtooth National Forest, Alternatives 3, 4, and 6 would have the least amount (none) of even-aged regeneration harvest over the next two decades, followed in ascending order by Alternatives 2, 7, 1B, and 5. Alternative 6 would have the least amount of intermediate treatments, followed in ascending order by Alternatives 4, 1B, 5, 7, 2, and 3. Alternative 1B would have the least amount of fire use acres, followed in ascending order by Alternatives 5, 4, 3, 6, 2, and 7. Alternatives 4 and 6 would have the least amount of road construction, followed in ascending order by Alternatives 2 and 7, 3, 1B, and 5. Alternative 6 would have the least amount of road reconstruction activities, followed in ascending order by Alternatives 4, 1B, 7, 2, 3, and 5.

Activity levels on the Sawtooth are generally much lower than those on the Boise and Payette, making the scale of potential visual impacts substantially lower overall. Alternative 5 would also be likely to have the greatest long-term changes to the landscape on the Sawtooth National Forest as well. Alternatives 3, 1B, 7, and 2 would all produce somewhat lower levels of long-term impacts than

Alternative 5. Alternatives 7 and 2 would both produce the highest levels of short-term impacts from prescribed fire and wildland fire use treatments. Alternatives 6, 3, and 4 would produce somewhat lower levels of fire use-related impacts. Overall, Alternative 4 would be likely to produce the lowest level of vegetation-impacts to the scenic environment.

Changes Related To Disturbance Events

While extremely difficult to predict or model with any degree of reliability, disturbance events can have considerable effect on the scenic landscape. Two of the most widespread landscape disturbances, epidemic insect outbreaks and uncharacteristic wildfire, were evaluated for the relative propensity to influence visual changes in the landscape. The *Vegetation Hazard* section in this Chapter of the EIS discusses these two elements in much greater detail. Data used here for alternative comparison is taken directly from that section. For evaluating visual effects this section will focus on those two disturbance elements in the forested vegetation complexes only. This is because the more long-term visual effects of these disturbance agents generally occur in forested vegetation. The changes that occur in the non-forested complexes are usually more subtle and temporary or short term.

Indicator 4 - Uncharacteristic Wildfire Hazard

Uncharacteristic wildfire events affect scenic quality in the short and long term depending on the severity, intensity and scale of the event. While it is recognized that characteristic, large-scale, lethal wildfire that can occur in some mixed and lethal fire regimes also may have visual impacts, these types of disturbance events were not modeled. This was due to the wildfire issue primarily being centered on uncharacteristic wildfires, or wildfires within wildland-urban interfaces. Public scoping and internal issue development did not identify characteristic wildfire occurrence as an issue outside of wildland-urban interface areas. As a result, this section on assessing visual impacts from wildfire focuses on uncharacteristic wildfire hazards.

The *Vegetation Hazard* section of this chapter utilizes an uncharacteristic wildfire hazard index to compare alternatives. These indices are comparative values that represent a relative measure of the hazards that contribute to the rise in uncharacteristic wildfire. A higher value indicates a more hazardous condition compared to a lower value. Table SE-7 displays the current index and the indices calculated at the fifth decade in forested areas outside of designated wilderness.

Table SE-7. Uncharacteristic Wildfire Hazard Indices for the Current Condition and the Fifth Decade by Alternative

Forest	Current Index	Index for Fifth Decade						
		Alt. 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Boise	0.65	0.81	0.45	0.41	0.38	0.57	0.41	0.57
Payette	0.50	0.62	0.43	0.38	0.38	0.50	0.38	0.49
Sawtooth	0.36	0.46	0.36	0.35	0.30	0.42	0.35	0.31

In considering the results of this analysis, the preceding analysis addressing management activities should also be taken into consideration. For example, Alternatives presenting the lowest indices for uncharacteristic wildfire hazard may be the result of vegetation treatments that also have visible effects on the scenic environment. In the cases of intermediate vegetation treatments and fire use, the long-term visual effects are likely to be less than those of large-scale, uncharacteristic wildfire.

Alternative 1B is higher than all other alternatives on each Forest because it is the only alternative that did not include reduction of uncharacteristic wildfire hazard as one of the modeling goals for emulating the National Fire Plan objectives.

Boise National Forest – Alternative 1B followed by Alternatives 5 and 7 would have the greatest risk for large-scale landscape changes due to uncharacteristic wildfire. Alternative 4 followed by 3 and 6 are the lowest, with Alternative 2 occupying a middle position. These alternatives would therefore be less likely to have large-scale landscape changes from uncharacteristic wildfire compared to Alternatives 1B, 5, and 7. Alternative 4 ranks lowest due to it having the highest amount of planned fire use directed at reducing wildfire hazards. Alternatives 1B, 5 and 7 which rank the highest, have lesser amounts of fire use and carry more area in moderate tree density in order to meet growth and yield themes.

Payette National Forest – Like the Boise, Alternative 1B followed by Alternatives 5 and 7 would have the highest likelihood of large-scale uncharacteristic wildfire events. Alternatives 3, 4, and 6 would be the lowest likelihood, while Alternative 2 occupies the middle range. Alternative 4 has the greatest amount of fire use directed at lowering wildfire hazards, while Alternative 7 has the least. Alternatives 1B, 5 and 7 carry more area in moderate tree density than those ranking lower in risk.

Sawtooth National Forest – The Sawtooth has less variation in changes in the uncharacteristic wildfire indices, and most of the alternatives have lower risk of uncharacteristic wildfire when compared to the Boise or Payette. This is due to the current hazard being lower than the other Forests because of the vegetative types that support more mixed and lethal fire regimes that do not produce the same kind of uncharacteristic wildfire hazard as nonlethal regimes. The mixed and lethal regimes found on the Sawtooth have naturally occurring lethal and larger-scale fires that are not considered "uncharacteristic". Alternative 1B is the highest followed by Alternative 5. Alternative 5 is the only other alterative with a higher index rating than the current condition. Alternatives 4 and 7 are the lowest, with the others (2, 3, and 6) occupying the middle range.

<u>Indicator 5 - Insect Hazard</u>

Insect hazard is defined as a relative measure of predisposing conditions for damage caused by insects. Damage from insects means that tree mortality can be expected to be higher than normal. The actual impact to visual resources is highly variable and dependent on a wide range of variables such as visual sensitivity of the area observed, as well as the magnitude, scale, and intensity of mortality from insect hazard. The *Vegetation Hazard* section of this chapter utilizes an insect hazard index that displays the relative hazard by alternatives. The *Vegetation Hazard* section contains detail on the assumptions and foundations for the calculations of hazard indices that are used here. Hazard ratings generally increase with increasing tree size and density. There are also unpredictable environmental factors such as rainfall and drought conditions that could significantly affect the actual levels of insect infestation and mortality.

While there are no quantifiable estimations expressed in acreages, the indices serve primarily as a comparative tool for assessing alternatives. As such, the predicted impact on visual resources can also only be expressed as function of comparative risk between alternatives.

Generally a forested setting has the ability to absorb endemic levels of mortality such that the visual impacts would be fairly minor. The larger-scale epidemic levels of tree mortality from insect infestations often result in very noticeable changes and visual effects that are usually considered negative. The perceived sensitivity to this change is also dependent on variables such as the location and visibility of areas of mostly continuous mortality. The most dramatic visual impact occurs during the first few years following stress and mortality when the orange needle condition appears in conifers. Once these needles fall the visual effect is reduced considerably, particularly in middleground or background viewing distances.

Table SE–8. Average Insect Hazard Indices by Alternative and Forest After Five Decades

Forest	Current Index	Index for Fifth Decade						
		Alt. 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Boise	1.41	1.71	1.66	1.70	1.72	1.68	1.72	1.65
Payette	1.36	1.78	1.76	1.77	1.79	1.73	1.77	1.78
Sawtooth	1.38	2.05	1.87	1.96	1.89	2.01	1.99	1.76

Table SE-8 shows that on each Forest the hazard index calculated for the fifth decade indicates an increased hazard for insect infestation in all alternatives compared with the current condition. Index values greater than 2 represent an expected higher propensity for epidemic levels of infestation. The indices in Table SE-8 represent Forest-wide averages; accordingly one would expect to find a range of lands from low hazard to high hazard ratings in each alternative. The indices serve primarily as a relative measure to compare alternatives and to track changes relative to the existing and desired conditions. It is expected that the lands managed with vegetation treatments will result in lower hazard ratings, while untreated stands of high density and advanced age will have higher levels of insect hazard ratings.

Boise National Forest - At the fifth decade all alternatives show relatively little variation, and each alternative has a higher index than the current condition. Alternatives 4 and 6 have the highest ratings, while Alternatives 2 and 7 are the lowest. Because the variations between alternatives are minor, it is expected that there would be little visual differences between alternatives related to insect mortality. All alternatives rank somewhat higher than the current condition. It is expected that the amount of visual change from insect mortality could be expected to increase somewhat. It is likely there could be an increase in localized epidemic infestations due to increased areas that have a higher level of propensity for such infestations.

Payette National Forest - At the fifth decade all alternatives show relatively little variation, and each alternative has a higher index than the current condition. Alternatives 1B, 4, and 7 have the highest ratings, while Alternative 5 is the lowest. Because the variations between alternatives are minor, it is expected that there would be little visual differences between alternatives related to insect mortality. All alternatives rank higher than the current condition. It is expected that the amount of visual change from insect mortality could be expected to increase in all alternatives. It is likely there would be an increase in localized epidemic infestations due to areas that have a higher level of propensity for such infestations.

Sawtooth National Forest - The Sawtooth displays a bit more variation between the alternatives at the fifth decade. Alternative 1B ranks the highest and Alternative 7 is the lowest. Variations between alternatives are still relatively small and it is expected that there would be little visual difference between alternatives related to insect mortality. All the alternatives on the Sawtooth show a considerable increase in insect hazard indices when compared to the current condition. It is expected that the amount of visual change from insect mortality could be expected to increase in all alternatives. It is likely there would be increased amounts of epidemic infestation levels due to areas that have a higher level of propensity for such infestations, especially in Alternatives 3, 6, 5, and 1B.

Cumulative Effects

Indicators 1 and 2 - Changes in Visual Quality Objectives

Each alternative's potential for changing the scenic environment can be examined for the entire Ecogroup to estimate large-scale, cumulative changes to the scenic environment. This potential is indicated by the anticipated acreages of each VQO class and the acres of VQO shifts. These figures are displayed in Table SE-9.

In general, the VQO and alternative relationships noted in the Direct and Indirect Effects are also evident over the cumulative effects area. Alternative 5 would allow the most human-caused change with its elevated levels of a modification VQO and the least amount of preservation VQO. As a result Alternative 5 is likely to display the most changes in the landscape resulting from management activities. Alternative 4 is likely to display the least change due to the high levels of preservation from the increased amounts of recommended wilderness. Similarly, Alternative 6 would retain a high level of visual quality as it has the least amounts of modification and maximum modification VQOs. Alternatives 2, 3 and 7 reduce the amount of retention and shift those acres to partial retention, modification, or maximum modification.

Table SE-9. Acres* of VQO and VQO Change by Alternative for the Ecogroup
(*Measured in thousands of acres)

Alt.	Preservation		Retention		Partial Retention		Modification		Maximum Modification	
	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing	Acres	Acres of Change From Existing
1B	1,705	0	982	0	2,223	0	1,420	0	284	0
2	1,720	15	867	-115	2,214	-9	1,498	78	315	31
3	1,720	15	867	-115	2,214	-9	1,498	78	315	31
4	3,561	1,856	489	-493	1,429	-794	875	-545	260	-24
5	1,041	-664	1,026	44	2,551	328	1,674	254	322	38
6	1,705	0	891	-91	3,042	819	754	-666	222	-62
7	1,705	0	848	-134	2,371	148	1,375	-45	315	31

Indicator 3 - Management Activities within the Southwest Idaho Ecogroup

Table SE-10 compares activities by alternative that would likely affect visual quality across the entire Ecogroup area over the next two decades, using annual averages from the SPECTRUM model. These values are also graphically displayed in Figures SE-1, SE-2, SE-3, and SE-4.

As noted in the Direct and Indirect Effects discussion, visual effects of even-aged regeneration harvests and road construction cannot be considered on an equal basis with those of intermediate treatments and fire use. Effects from intermediate treatments are likely to be more subtle and shorter in duration. Fire use treatments would be much shorter in duration than those of even-aged regeneration harvests and road construction and also cannot be considered on an equal basis for potential effects.

Table SE-10. Activities by Alternative – Southwest Idaho Ecogroup Area
(Annual averages of acres or miles for the first two decades)

Activity Group	Activity Acres or Miles						
	Alt 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of even-aged harvest	6,460	600	65	0	7,530	55	3,010
Acres of intermediate treatment	11,555	17,440	22,470	6,075	14,750	7,185	15,110
Acres of fire use	14,690	24,840	20,075	33,270	7,390	33,420	23,650
Miles of road construction	25.5	29.2	21.2	5.3	30.4	3.1	22.4
Miles of road reconstruction	102.0	97.7	91.7	22.2	124.3	33.3	93.4
Miles of road decommissioning	54.0	82.5	109.5	43.8	63.7	24.1	63.7

As discussed under the direct and indirect effects, even-aged regeneration harvests have the most potential for highly noticeable, long-term visual impacts on the landscape. For the Ecogroup area, the least amount of even-aged regeneration harvest over the next two decades would occur under Alternative 4, followed in ascending order by Alternatives 6, 3, 2, 7, 1B, and 5.

Intermediate vegetation treatments, like tree thinning and selective harvest, would remove trees and open up stand conditions, but these treatments tend to blend much better into the natural-appearing landscape and have far less visual impact than larger regeneration openings or long road cuts. For the Ecogroup area, Alternative 4 would also have the least amount of intermediate treatments, followed in ascending order by Alternatives 6, 1B, 5, 7, 2, and 3.

The visual impacts of fire use, if implemented properly, should be short term and natural appearing, particularly if fire lines are kept to a minimum and burns are designed to emulate low-intensity wildland fire. For the Ecogroup area, Alternative 5 would have the least amount of fire use acres, followed in ascending order by Alternatives 1B, 3, 7, 2, 4, and 6.

Road construction would also have highly noticeable, long-term visual impacts on the landscape, primarily in the form of linear openings in the vegetation. Alternative 6 would have the least amount of road construction, followed in ascending order by Alternatives 4, 3, 7, 2, 1B, and 5.

The visual impacts of road reconstruction are highly variable due to the wide variety of activities that fall under the reconstruction title. Some, like road relocation, can be highly visible, while others, like road graveling, typically have little effect and can even be designed to reduce visual impacts. Alternative 4 would have the least amount of road reconstruction activities, followed in ascending order by Alternatives 6, 3, 7, 2, 1B and 5.

Overall, Alternative 4 would have the least amount of visual impacts over the next two decades from the vegetation and road management activities described above. This alternative would have the least amount of acres in even-aged regeneration harvests and intermediate vegetation treatments, the least amount of miles of road reconstruction, and the second lowest amount of road construction miles. These ratings indicate a very low level of development, not unexpected in an alternative that emphasizes ecological processes. Alternative 6 would also have a relatively low level of visual impacts from proposed development. Although both Alternatives 4 and 6 have high potential acres of fire use, fire is an ecological process, and the effects of properly implemented fire use would likely be short term and result in a natural-appearing landscape character.

Alternative 3 would have the next overall lowest amount of visual impacts. Potential effects from even-aged regeneration harvests and road construction, the two most obvious forms of development, would be relatively low. This alternative would have the highest amount of intermediate vegetation treatments, but those treatments would be designed to move vegetation toward its Historic Range of Variability, which should have beneficial visual effects over the long term, compared to large-scale stand-replacing disturbance from even-aged regeneration harvests or wildfire.

Alternatives 1B, 2, and 7 would likely have moderate effects to the Scenic Environment, although effects would vary depending on the type of impact. Alternative 1B, for example, would have more impacts from even-aged regeneration harvests and road reconstruction than 2 or 7, but Alternative 2 would have more impacts from road construction than 1B or 7. Alternative 5 would have the most impacts from even-aged regeneration harvests, road construction, and road reconstruction, and would therefore likely have the highest overall visual impact of all alternatives.

There may also be opportunities to reduce visual impacts on the landscape through activities that decrease the effects of existing development. One such activity that has that potential, and that has been analyzed for revision, is road decommissioning. Over the next two decades, Alternative 3 would decommission the most roads across the Ecogroup area, followed in descending order by Alternatives 2, 5, 7 (same as 5), 1B, 4, and 6 (see Table SE-10).

Figure SE-1. Regeneration Harvest by Alternative for the Ecogroup Area

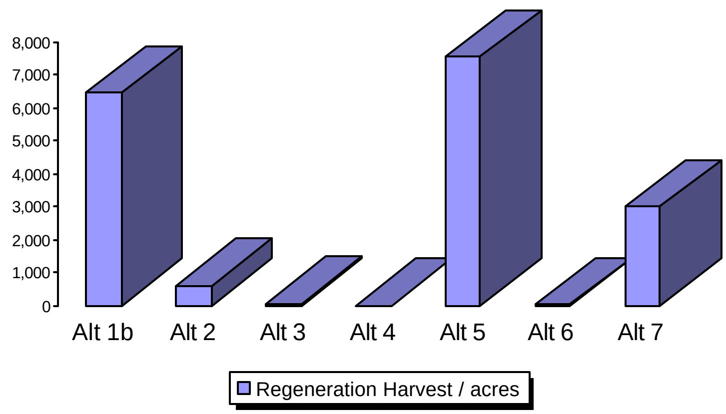


Figure SE-2. Intermediate Treatment Acres by Alternative for the Ecogroup Area

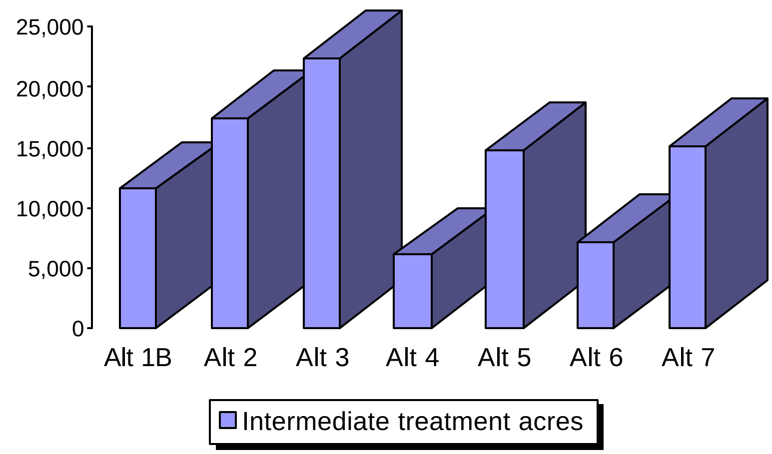


Figure SE-3. Fire Use by Alternative for the Ecogroup Area

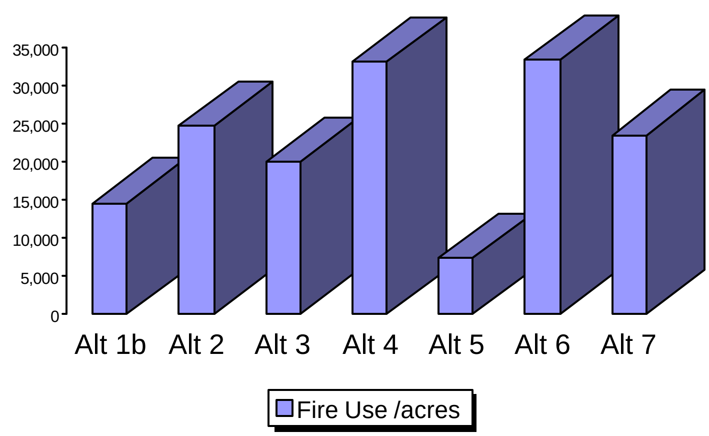
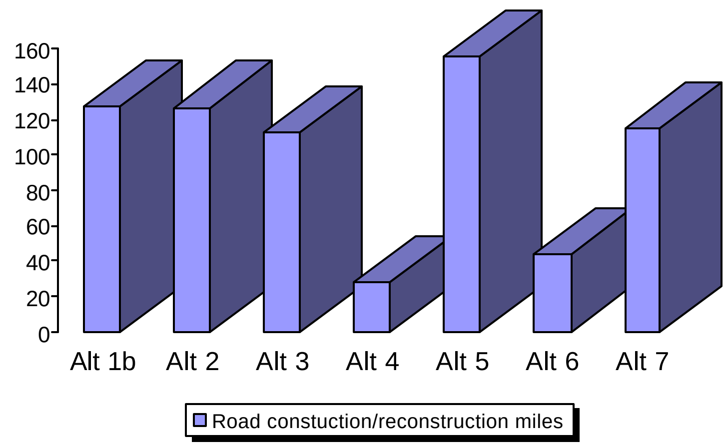


Figure SE-2. Road Construction/Reconstruction by Alternative for the Ecogroup Area



Indicator 4 - Disturbance Events – Uncharacteristic Wildfire Hazard

Table SE-11 displays the uncharacteristic wildfire hazard indices for the current condition and for the fifth decade for forested areas outside of designated wilderness for the entire Southwest Idaho Ecogroup area.

Table SE-11. Uncharacteristic Wildfire Hazard Indices for the Current Condition and the Fifth Decade by Alternative

Current Index	Index for Fifth Decade						
	Alt. 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
0.53	0.66	0.42	0.39	0.36	0.51	0.39	0.48

Alternative 1B has the highest index and would have the highest probability for uncharacteristic wildfires that could affect the scenic quality of the landscape. Alternative 1B is also the only alternative with an index rating higher than the current condition. Alternatives 5 and 7 have the next highest ratings, followed in order by 2, 6, 3, and 4. It is likely that Alternative 4 would have the lowest probability of uncharacteristic wildfires compared to all the other alternatives. This is somewhat due to that alternative having the highest acreage of fire use that is targeted at areas of high risk (see Table SE-10, Activities by Alternative). Alternatives 1B and 5, which rank the highest, have the least amount of fire use and carry more area in moderate tree densities than the others in order to meet growth and yield themes.

Indicator 5 - Disturbance Events – Insect Hazard

Table SE-12 displays the insect hazard indices for the current condition and for the fifth decade for forested areas outside of designated wilderness for the Southwest Idaho Ecogroup Forests.

Table SE-12. Average Insect Hazard Indices for the Current Condition and the Fifth Decade by Alternative

Current Index	Index for Fifth Decade						
	Alt. 1B	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.38	1.82	1.75	1.79	1.78	1.77	1.80	1.72

At the fifth decade Alternative 7 has the lowest ranking, while Alternatives 1b and 6 are the highest. Alternative 7 could be expected to have slightly less insect caused mortality than the other alternatives. All alternatives have higher hazard indices than the current situation. As a result it is expected that there would be continued and increased amounts of visual change in the landscape from insect-caused mortality in all alternatives. The magnitude and intensity of that impact is difficult to predict, as the actual impact will vary tremendously depending on the location and intensity of infestations relative to sensitive viewing locations such as trails, Forest highways and roads, and popular recreational use areas.

Other Cumulative Effects on Scenic Quality

Smoke emanating from off-Forest agricultural burning and wildfires can result in or contribute to visibility impairments in Forest areas. Normally, on-Forest prescribed fire activities are restricted whenever off-Forest sources are causing adverse effects within shared airsheds. Visibility impairments due to smoke from wildfires and prescribed fire use are temporary but can affect very large areas, such as entire National Forests.

In areas of interspersed ownership within National Forest System lands, there is potential for combined effects to visual resources from National Forest activities and those evident on other ownership lands. In many highly scenic locations within the Ecogroup, National Forest System lands are mingled with those of other government agencies and private lands such as Cascade Reservoir and along the South Fork of the Boise River. Management activities on other lands that do not blend into the landscape can negatively affect the experiences of Forest users who are viewing scenery. Although, most land management agencies follow some type of scenery management policy, no constraints apply to private lands to preserve visual qualities, except for within the SNRA. Development and timber harvest on private lands adjacent to National Forest are often accomplished with different objectives than on public lands. Harvest types vary on commercial, private timberlands, and harvest levels generally tend to increase as federal timber supplies decrease, given stable or improving market conditions. Effects to visual resources may or may not be a consideration in the management or developments of these private lands, potentially resulting in developments that can contribute to the loss of natural-appearing landscape character. In that these harvests may increase with reduced levels of timber sales on federal lands, the potential effects associated with this development are likely to be highest under Alternatives 4 and 6, and lowest under Alternative 5.

As mining claims were patented and public lands were homesteaded, private lands within the Forests increased. Over time, a number of these inholdings have been developed into private residences. Another recent development trend is the conversion of adjacent agricultural land to rural residences.

Private land development trends generally run parallel to national economic trends, and increased with the strong economy in the late 1990s. The development of these private lands has affected the scenic quality of the landscape of the Forests as well as the experiences of scenery viewers. This development includes signs, utility lines, access roads, timber harvests, residences, and business structures. Some homeowners cut or thin their timber stands to provide views. Much private land occupies drainage bottoms and travel routes. Public desires to live in a rural, mountain environment have resulted in urbanization of some adjacent ownerships. Development of agricultural lands to rural residences can result in pastoral landscapes changing to rural or, in higher density developments, near-urban landscapes. In some areas, summer home developments are defining the Forest boundaries. When structures are designed to blend into the landscape, the visual effect can be minimal. Structures and development that do not blend with the landscape can have more severe impacts. These effects are likely to vary under any alternative with the national economy.

Another issue related to urbanization is the desire of property owners to preserve their scenic views of the surrounding Forest. Private lands near the Forest generally are more valuable when there is a scenic view of National Forest System lands from the property. If management activities detrimentally alter the forest scenery, there is potential to result in lower property values. Thus, property values may increase or decrease adjacent to the Forest depending, to some extent, upon the quality of the scenic environment.

Cultural Resources

INTRODUCTION

Cultural resources, managed under the Heritage Program, represent the physical remains of past human use and activities on the National Forests. Cultural resources include artifacts and sites such as projectile points, rock shelters, stone circles, wagon trails, homesteads, mining sites, Civilian Conservation Corps camps, and Forest Service administrative sites. Cultural resources are non-renewable. Once sites are disturbed or artifacts are removed, information about our heritage is forever lost. Disturbing sites or collecting and removing artifacts from federal lands without a permit is prohibited.

The Forest Service seeks to ensure present and future generations a genuine opportunity to appreciate and experience our nation's rich and diverse heritage. Heritage stewardship and natural resource management must exist in productive harmony to fulfill social, economic, and spiritual needs of the American people.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect cultural resources.

Background to Issue – No significant issues related directly to cultural resources were identified during public comment periods or the Need For Change analysis process. However, Forest management activities have the potential to directly, indirectly, or cumulatively affect cultural resources. Management activities can influence site disturbance or discovery, improve or restrict access to sites, or provide opportunities and funding for conducting surveys and recording sites. These activities are related to many of the Need For Change topics, and could be implemented under any of the alternatives. Also, compliance with federal laws governing cultural resources is an important management concern. Therefore, potential effects on the cultural resources are analyzed in this section.

Given the numerous laws, regulations, and policies that govern the use and administration of cultural resources on National Forest System lands that would apply under any alternative, significant differences in effects to cultural resources by alternative are not expected. However, some level of risk of effects to cultural resources associated with management activities is present under every alternative. This level of risk varies in proportion to the level of management activities anticipated under each alternative.

Issue Indicator - The following indicator will be used to measure the potential risk to cultural resources from management activities. The indicator is intended to show relative differences between alternatives, rather than to represent the actual acres of treatments that are expected to occur.

- *Acres of vegetation treatments in the first two decades*. This indicator reflects the relative levels of anticipated management activities that pose the predominant risks to cultural resources under each alternative. The first two decades are used to cover the entire potential duration of the revised Forest Plan.

Affected Area

The affected areas for direct and indirect effects to cultural resources are the lands administered by the three National Forests in the Ecogroup. This area represents National Forest System lands where cultural resources could exist, and lands where those resources could receive impacts from both management activities and natural events. The affected area for cumulative effects includes the lands administered by the three National Forests, and lands of other ownership both within and adjacent to these National Forest boundaries. Cumulative effects to resources on other land ownerships are addressed to lend a broader perspective to the importance of resources on the Forests.

CURRENT CONDITIONS

Human occupation of the Ecogroup area has been continuous for at least the last 11,000 years, and probably longer. Remains of past human life ways are found throughout the Forests. Table C-1 provides the status of lands inventoried for cultural resources.

Table C-1. Heritage Program Status, as of June 2001

Program Activity or Objective	Boise NF	Payette NF	Sawtooth NF
Acres Surveyed	204,000	234,000	153,400
Percent of Forest Surveyed	9%	10%	7%
Number of Sites Recorded	2,200	1,605	1,600-1,700
Number of NRHP Listings	1	15	5
Number of Eligible NRHP Listings	342	585	510
Number of Unevaluated Sites	340	470	500
Number of Potential Undiscovered Sites	8,000	1,500	10,000
Estimated Number of Potential NRHP Eligible Undiscovered Sites	340	600	3,500

In addition to the properties listed in Table C-1, ten sites across the Ecogroup area have been interpreted for public appreciation and awareness. Numerous brochures and reports are available for the public regarding cultural resources and their management of the Forests, and several research projects have been recently conducted on the Forests under the supervision of Forest Archaeologists. “Passport in Time” and “Windows on the Past” projects are conducted on the three Forests and are increasing in popularity with the public.

In the *Preliminary AMS for the Southwest Idaho Ecogroup Forest Plan Revision* (USDA Forest Service 1997), the Heritage Program is one of a number of program areas needing strengthened management direction in the Forest Plans. Specifically, Heritage Program goals, objectives, standards, and guidelines needed to be revised to meet the intent of legislation and executive orders implemented since the original Plans were approved. The revised Plans also needed to acknowledge the agency's 1992 change from a "Cultural Resources Program" focused primarily on compliance, to a "Heritage Program" that emphasizes a balance between protection of historic properties and public outreach for the enjoyment of American history. The strengthening of management direction and acknowledgement has occurred for the action alternatives (2-7).

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Resource protection is integrated into cultural resource management at all levels, from national to site-specific. The cumulative positive effect of the revised Forest Plan management direction coupled with direction comprised by the laws and regulations described below is beneficial protection and mitigation for cultural resources potentially affected by management activities.

Laws, Regulations, and Policies – Numerous laws, regulations, and policies govern the use and administration of cultural resources on National Forest System lands. Some of the more commonly used regulations are described in Appendix H to the Forest Plans. National laws and regulations are also interpreted in Forest Service Manuals, Handbooks, and Regional Guides. Management activities occurring on Forest administered lands comply with these laws, regulations, and policies intended to provide general guidance for the implementation of the Heritage Program and for protection of cultural resources.

Forest Plan Direction – Although Forest Plan management direction for cultural resources would vary somewhat in Alternative 1B, maintenance or improvement of cultural resource conditions on National Forest administered lands is emphasized under all alternatives. This management direction occurs at both Forest-wide and Management Area levels. Cultural resource goals and objectives are designed to achieve desired conditions and implement the Heritage Program over the long term. Standards and guidelines are designed to protect cultural resources.

Forest Plan Implementation - A variety of methods are available to eliminate, minimize, or reduce direct effects on cultural resources at the project level. Archaeological excavation or structural inventory and recording can provide for recovery of heritage data. Activities and projects can be modified to avoid cultural resources. Scheduling projects when the ground is frozen can reduce or eliminate soil compaction and disturbance to avoid damage to resources.

Relocating certain features or structures, increasing monitoring and law enforcement, providing interpretation activities and securing restrictive covenants in land transfer deeds and acquisitions are other protective measures. Developments in archaeological modeling have also improved the Forest Service's ability to identify areas of high risk to cultural resources.

Methods to eliminate, minimize, or reduce indirect effects include initiating public education programs, posting cultural resources with informational signs, monitoring sites, rerouting trails, stabilizing eroding sites, constructing barriers, hiding sites, and properly designing adjacent projects to minimize visual, auditory or atmospheric intrusions, as well as undertaking all the mitigation methods listed above for direct effects.

Methods that can be employed to eliminate or reduce cumulative effects are site recording, data recovery, site interpretation, incorporation of state-of-the-art research techniques, and stabilization or restoration.

General Effects

Because cultural resource management is explicitly defined by law, regulation, and policy, management practices and their effects would not differ substantially between the revision alternatives. In all alternatives, the Heritage Program would provide support to all of the resource projects, as required under Section 106 of the NHPA. The program would include inventory, analysis, protection, stabilization, and public interpretation of cultural resources under all alternatives. The levels of these individual activities and projects would vary to some degree by alternative, but the general neutralizing or positive effects of mitigation, protection, and education would remain the same.

In all alternatives, the potential exists for undiscovered sites, especially those that are buried, to be exposed and/or damaged by surface disturbance or other events. Natural erosion and depositional processes degrade cultural resources. Inadvertent damage during project implementation also occurs. These sites may or may not be noticed in time to allow mitigation. This risk of unavoidable damage is common to all alternatives.

Direct effects also could occur to cultural resources as a result of non-sanctioned activities, such as vandalism or illegal excavation. Efforts to control and monitor these activities are similar in all alternatives, and would result in an extremely low level of cumulative adverse effects to cultural resources.

All alternatives would have some irreversible commitments of cultural resources. Examples are inadvertently damaged or destroyed sites, vandalized or looted sites, and sites that not been inventoried and recorded and are undergoing loss from natural processes. Every alternative seeks to reduce those potential losses through inventory and evaluation, monitoring, and improved project implementation to ensure that these losses are kept to a minimum.

Data collection through excavation, the most common mitigation for unavoidable impacts, also results in some loss of resources. Use of cultural sites and resources for public interpretation, education and service may also result in some level of damage or loss of resources. However, beneficial indirect effects, that counterbalance the negative effects, are usually achieved through public education and increased sensitivity for cultural resources.

Direct and Indirect Effects

Direct effects on cultural resources can result from both natural events and from human activities that damage the resources or alter their settings. Ground disturbance occurs in a wide range of management activities including timber harvest, road and trail construction, reconstruction, relocation, maintenance, and decommissioning, prescribed burning and wildfire control, mineral and energy exploration, development and reclamation, facility construction, utility development, recreational vehicle use, and range, watershed and wildlife improvement construction. Other potentially damaging effects include soil compaction, erosion, flooding, soil slumping, heating and freezing, wildfire, prescribed burning, livestock trampling, recreational vehicle use, setting alterations (including introduction of atmospheric, visual, or audible intrusions), and loss of undiscovered cultural resources if land is transferred from federal to nonfederal ownership.

Vegetation treatments represent a substantial portion of the risk of effects to cultural resources associated with management activities that would occur under every alternative. These treatments include a combination of management-ignited fire and wildland fire use, as well as all scheduled mechanical vegetation treatments such as thinnings, selection harvests, shelterwood harvests, and clearcuts. The level of risk varies in proportion to the combined levels of these management activities anticipated under each alternative. The acres of vegetation treatments in the first two decades are used to assess the relative levels of anticipated management activities under each alternative and are displayed in Table C-2. The first two decades are used to cover the entire potential duration of the revised Forest Plan. These indicators are intended to show relative differences between the alternatives, rather than to represent the actual acres of treatments that are expected to occur.

Table C-2. Acres of Vegetation Treatments in the First Two Decades*

National Forest	Acres						
	Alt 1B	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Boise	345,000	444,000	436,000	406,000	227,000	413,000	401,000
Payette	269,000	276,000	281,000	288,000	207,000	299,000	272,000
Sawtooth	36,000	145,000	127,000	83,000	48,000	100,000	158,000
Ecogroup Totals	**650,000**	**865,000**	**844,000**	**777,000**	**482,000**	**812,000**	**831,000**

* Acreages are rounded to the nearest 1,000.

Alternative 2 probably presents the highest risk to cultural resources on the Boise, since it represents the highest total level of vegetation treatment over the next two decades. However, treatment levels under Alternatives 2, 6, 4, and 7 are also relatively high. Alternative 1B presents a relatively moderate level of risk, while Alternative 5 probably presents the lowest level of risk.

On the Payette, the differences between the alternatives are relatively smaller than they are on the Boise. Alternative 6 likely presents the highest level of risk and Alternative 5 presents the lowest level. All of the other alternatives present risks almost as high as Alternative 6.

Treatment levels are substantially lower on the Sawtooth than either the Boise or Payette. Alternative 7 likely presents the highest level of risk and Alternative 1B presents the lowest level. Alternative 2 presents almost as high a level of risk as Alternative 7. Alternatives 3, 6, and 4 present relatively moderate levels while risks under Alternative 5 would likely be only slightly higher than Alternative 1B.

Conversely, there is also a direct relationship between the number of acres proposed for vegetation treatments and the number of acres surveyed for cultural resource sites, as well as the number of cultural resource sites located and evaluated. Cultural resource surveys are usually financed through project-level funding. As a result, the greater level of treatment projects, the greater the level of survey, location, and evaluation. On an Ecogroup-wide basis, it is likely that Alternatives 2, 3, 7, 6, and 4, respectively, would result in somewhat higher levels of inventory, analysis, and stabilization than Alternatives 1B and 5 due to their higher levels of proposed vegetation treatments. Cultural sites would be avoided or mitigation of effects would occur. Conversely, it could also be assumed that Alternatives 2, 3, 7, 6, and 4, respectively, would pose the highest threats to cultural resources on an Ecogroup-wide basis due to their high vegetation treatment levels. Under all of the alternatives, any known threats to cultural resources would be evaluated and mitigated, as warranted, during project-level planning and implementation.

Recreation use can have significant adverse effects due to the fact that use is mostly unregulated across the three Forests, combined with the fact that some form of recreation use occurs on virtually every acre of National Forest. For planned recreation developments, most of the potential direct effects can be eliminated or mitigated during project planning and implementation. However, indirect effects from dispersed use such as increased vandalism, trampling, loss of integrity, or erosion cannot be mitigated across the remaining expanses of Forest because inventories are generally incomplete outside the limits of developed recreation sites and facilities.

Use of off-road vehicles (ATVs, motorcycles, 4-wheel drive vehicles) can have both direct and indirect effects. Driving over cultural sites can result in direct damage to cultural resources. Indirectly, the use of off-road vehicles can damage or destroy vegetation, inorganic surface crusts, and natural ground litter. Compaction of soils, alteration of soil stratigraphy, and reduced water-infiltration rates can result. This can lead to higher runoff and erosion rates. Increased looting and vandalism may occur. These effects would occur under any alternative, but to a lesser degree under Alternatives 4 and 6, which would prohibit off-road use in more areas of the Forests.

As recreational use of the three Forests continues to rise due to the increased visitation, impacts to cultural resources are expected to increase. Unauthorized collecting, theft, excavations, and vandalism occur now and will continue.

Damage to cultural resources can also occur from livestock grazing and range improvement construction or development. For planned range improvements, most of the potential direct effects can be eliminated or mitigated during project planning and implementation. Cultural resources most likely damaged by livestock grazing and rangeland management activities are those in areas of intensive livestock use such as near water tanks, salt blocks, or along fence lines. The potential for this damage is not expected to vary greatly between alternatives.

Landownership adjustments could potentially result in the loss of federal protection for cultural resources on lands transferred to other ownership. However, prior to landownership transfer, inventories are conducted and mitigation is applied, if needed. In proposed standards and guidelines, heritage values are included among criteria for land acquisition prioritization, making land acquisition another potential method for protecting and preserving valuable cultural resources. Since acquisitions are largely a function of budget, and the lands budgets are not expected to vary much by alternative, landownership adjustments are also unlikely to vary much by alternative.

Indirect effects can include improved access that brings more visitors and a rise in vandalism, removal of materials, inadvertent damage or fires, and visual and auditory disturbances from adjacent or nearby activities. Changes in the extent of access, either lengthening or shortening of roads, can also increase the area of potential effects. All alternatives would reduce the overall transportation system over the short and long terms; however, the most new road construction is expected to occur under Alternative 5, followed in order by Alternatives 2, 1B, 7, 3, 4, and 6.

Cumulative Effects

Cumulative effects over time can include loss of sites or resources prior to development of better research techniques, loss of interpretive values, and incremental loss of the cultural resource base.

Forest management projects may cause surface disturbance, bring additional people in contact with cultural resources, or affect the fabric of historic structures. Differences in cumulative effects to cultural resources under different alternatives as a result of sanctioned management activities should be low because of the protection and mitigation measures that will be implemented.

Alternatives that result in more acres of planned and budgeted management activities could reduce adverse cumulative effects. This is because more inventory and evaluation would be required under these alternatives. The additional inventory and evaluation would lead to more cultural resources being located and a reduction of adverse cumulative effects caused by natural processes after cultural resources are brought under appropriate management.

Cumulatively, cultural resources on federal lands may assume greater importance because such resources on lands of other ownership are not provided the same degree of protection. Construction and development on private lands may destroy cultural sites without providing an opportunity for recovery of data or other mitigation unless the projects are the result of federal licensing, permitting, or funding. Cumulative risks to cultural resources on state and private lands are furthermore thought to be greater than on federally administered areas for several reasons:

- There is a higher likelihood that important cultural resources occur on these lands due to historic settlement patterns and more favorable environmental patterns;
- Little or no inventory or evaluation is being conducted;
- Implementation of protection or mitigation measures is extremely rare; and
- Local governments have few ordinances to protect cultural resources.

Roads

INTRODUCTION

Access to the Boise, Payette and Sawtooth National Forests is provided by a complex and integrated transportation system of roads under Forest Service, county, state, and private jurisdiction. The entire system of roads amounts to approximately 10,700 miles of classified roads that range from double-lane paved highways to narrow, native-surface roads. An estimated 93 percent of these miles comprise Forest roads under the jurisdiction of the Forest Service. The remaining 7 percent, including approximately 500 miles of designated Forest Highways, are controlled by other public agencies or private concerns. This integrated road system connects the Forest road system to towns, communities, and major state and interstate highways.

Roads are important facilities on the Boise, Payette, and Sawtooth National Forests, providing access for recreation activities, timber removal, resource utilization, wildland fire protection, and for facilities operated under special use authorizations. However, roads also have the potential to adversely affect a number of resources in various ways. Forest road systems are dynamic in that roads may be constructed or re-constructed for needed access, some or they may be closed or decommissioned in an effort to reduce impacts to other resources. This section of Chapter 3 describes the potential effects of each alternative's management strategies on the road system rather than the effects of roads on other resources. Analysis of the effects of roads on other resources can be found in the corresponding resource sections in this chapter.

In forest plan revision, roads are addressed at the programmatic scale rather than a site-specific or individual road scale. As such, this process does not determine whether specific roads will be constructed, maintained, periodically closed, or decommissioned. Through their management direction, forest plans provide a basis for analyses and decisions that follow and are required to make those types of site-specific decisions.

Forest System trails are addressed in the *Recreation* section of this Chapter.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect the road transportation system and how these roads are maintained.

Background - Management of National Forest System roads is an issue of national concern. Public interest in the roads within National Forests is increasing, and few natural resource issues in recent years have attracted as much public scrutiny as road management. Critical issues linked to the roads within National Forests include public access, resource damage, habitat loss, maintenance capabilities, and economics. Yet some level of road development is needed to produce the goods and services that

Americans expect from their national forests. A long-term road strategy to address many of these issues was developed and reflected in the Forest Service Road Management Strategy adopted January 12, 2001. Sometimes referred to as the "Roads Rule", this policy established the scope and scale of roads analyses needed to inform road management decisions regarding new construction, reconstruction and decommissioning. It also established parameters for construction and re-construction of roads within Inventoried Roadless Areas.

Comments received both externally and internally reflected two components: the number of miles of designated Forest roads that are developed, and how the roads are maintained. A large number of comments received during forest plan revision comment periods focused on the amount of roads that should be maintained as part of the system. Comments were divided between those expressing the need to maintain current access and roads for resource management and recreation needs and those supporting reducing the road system to reduce impacts of roads on other resources and the need to lower road densities. Many comments expressed concerned that overall access to the Forests was decreasing. One comment suggested the adoption of a "no net loss of roads" policy. Other comments expressed concern about concentrating public use on fewer and fewer acres, thus causing increased resource damage. Still other comments questioned the merits of reducing the road system in the face of expanding recreation use and access needs. Opposing comments favored a policy of "no new roads", especially in areas that are currently unroaded. These comments led to a significant issue related to the level of the managed road system that should be developed on the three Forests. Reducing the level of access, through decommissioning roads, would potentially:

- Concentrate use, increasing resource impacts in those areas;
- Reduce the safety of recreation experiences;
- Reduce economic development opportunities; and
- Reduce resource management capabilities.

Conversely, continued expansion of the road system would potentially:

- Increase potential impacts to fish habitat and Threatened, Endangered and Sensitive species;
- Increase fragmentation of habitat for terrestrial wildlife species; and
- Reduce opportunities for primitive recreation experiences away from the influence of roads.

Road access on National Forests consists of two components: Classified roads, which are usually part of the National Forest Road system or roads under other jurisdiction; and unclassified roads, which are usually user-created roads that have never been designed, constructed, or maintained. Analyzing effects to classified roads under each alternative would only address one side of potential impacts to access on the three National Forests. Like classified roads, unclassified roads are also dynamic in that users create new ones, while others are decommissioned. To provide a more complete estimate of potential effects to road access under the alternatives, this analysis will address potential effects on both classified roads and unclassified roads.

Some comments also expressed concern about road maintenance funding, specifically that expected road maintenance budgets may not provide for the adequate and timely maintenance of all Forest classified roads to their appropriate standard. The inability to provide an appropriate level of road maintenance could require the Forests to close roads until user safety and resource protection can be assured.

Indicators - The following indicators are used to measure the effects of management strategies on Forest roads on the three Forests by alternative.

- Indicator 1 - *Projected total miles of Forest Classified Roads in 2015.* This indicator is used to assess how Forest access levels may vary by alternative through the next planning period.

- Indicator 2 - *Estimated miles of unclassified roads decommissioned by 2015*. This indicator is used to assess relative levels of decommissioning of unclassified roads through the next planning period under each alternative.

- Indicator 3 - *Percentage of anticipated 2015 Forest Classified Roads maintained to standard based on experienced budget averages*. This indicator is used to compare the alternatives relative to anticipated road maintenance capabilities.

Affected Area

The affected area, for direct and indirect effects to roads, is the Forest Classified Road System within the three National Forests of the Ecogroup. This transportation network represents the roads that could receive impacts from both management activities and natural events. The affected area for cumulative effects includes these roads plus additional Forest Highways that lie within Ecogroup area boundaries, but that are under the jurisdiction of other agencies or governments. Cumulative effects to roads that are under other jurisdiction are addressed to lend a broader perspective to the importance of roads on the Forests and to emphasize cooperation among all local transportation resource providers.

CURRENT CONDITIONS

Forest road systems are dynamic. Forest engineering and resource personnel work together in an on-going process of transportation system planning and management. Roads are constructed and reconstructed based on established standards for their intended use and anticipated long-term management needs. Most new road construction is done in support of timber management, although small amounts of road are occasionally constructed for recreation or mining access. Road reconstruction is done for a number of purposes, which include improving road conditions for driver safety and mitigating resource impacts. Road decommissioning occurs when a road is no longer needed for resource management. Road decommissioning terminates motor vehicle use of roads no longer needed and restores ecological processes interrupted or impacted by the unneeded roads. Roads are also candidates for decommissioning when maintenance requirements and resource impacts outweigh access needs. Decommissioning includes various levels of treatments to stabilize and rehabilitate unneeded roads such as blocking the entrance, revegetating and water barring, removing fills and culverts, re-establishing drainage-ways, and removing unstable road shoulders, or full obliteration by recontouring and restoring natural slopes. A site-specific analysis is required for all road construction, reconstruction, or decommissioning on the Forests.

Currently, new road construction ranges from 0 to 10 miles per year, reconstruction ranges from 0 to 40 miles, while decommissioning ranges from 0 to 40 miles on the Ecogroup Forests. The activity level varies depending on the number and type of projects that are approved for implementation each year. Implementation is dependent on the level of public controversy with proposed projects, agency priorities, and allocated funding levels.

Managing and maintaining the existing National Forest System roads has not kept pace with the rise in visitors to our national forests and grasslands or the increased scientific understanding of the ecological effects of roads. In 1999, the Forest Service initiated a process to develop a new road management policy for all National Forest System lands managed by the agency. In January 2001, the Forest Service adopted a new road management policy, which directs the agency to maintain a safe, environmentally sound road network that is responsive to public needs and affordable to manage. The new roads policy updates the previous roads policy written in the early 1970s. The purpose of the new policy is to provide guidelines for how the agency will manage existing roads. It includes an analysis process to be used before building new roads and a process for determining when roads are to be decommissioned. The policy relies on Forests conducting a science-based analysis of their long-term access needs and integrating the results of that analysis into the forest planning process. Currently, the Forest Service is looking at ways to make the road management policy work better and is conducting an internal review of the policy. Transportation system management on the three Ecogroup Forests will be consistent with the direction provided by the new policy.

Existing Road System

Most of the administrative, commercial, and public travel on the three Forests occurs on the National Forest System road network of classified roads. Access to the Forests is provided largely by a combination of classified roads under Forest Service jurisdiction, along with roads under county and state jurisdiction. In some locations, access is provided through cost-share roads. These are Forest roads that are constructed and maintained in partnership with other agencies or private landowners when access is of mutual benefit to two or more parties. User-created roads also exist in numerous locations

Through transportation analysis, public access opportunities are analyzed and may be provided along with controls and restrictions necessary to achieve land management objectives. Many of the classified roads within the Ecogroup area have been determined to be needed for public access or resource management needs and are open and available for public use.

Forest roads provide access in a branching system of arterial, collector, and local roads. Arterials provide access to large land areas, typically by linking to county roads, state highways, or communities. They have the highest standards for construction and maintenance because of the larger volume of traffic they carry. Collector roads disperse traffic from arterials to large Forest areas such as watersheds. Local roads, used to access specific project areas or sites may be of a lower standard of construction. Table RO-1 displays the total miles of Forest roads under Forest Service jurisdiction on the three Forests by functional class.

In some areas, "roads" develop not through planning, design, and construction, but through repeated passage of vehicles traveling off of transportation system roads. These unplanned travelways are commonly called a number of names, including "ghost roads" and "two-tracks", and are not considered to be part of the road system, nor are they included in the roads in Table RO-1. In this analysis, these roads are referred to as unclassified roads.

Table RO-1. Approximate Miles of Existing National Forest System Roads Within Forest Service Jurisdiction*

National Forest	Functional Class		Total
	Arterial / Collector	Local	
Boise	921	4,026	4,947
Payette	706	2,437	3,139
Sawtooth	413	1,506	1,919

*Source of classified road mileage estimates are FY 2002 Road Accomplishment Reports.

Road Maintenance

Maintenance of Ecogroup Forest system roads is complicated because it is accomplished through cooperation with other agencies and private concerns. In some cases, maintenance responsibilities are exchanged with other jurisdictions through maintenance agreements when such actions create efficiencies for both parties. Roads maintained by other agencies, local governments, or private organizations under road maintenance agreements are maintained according to the terms of the maintenance agreement, which may not necessarily be to established agency-set standards. In cost-share road cases, maintenance is accomplished commensurate with commercial uses of the road. In that jurisdiction of Forest roads sometimes shifts to county or state agencies, road maintenance responsibilities are not static. The total miles of road maintenance responsibility for 2002 are displayed in Table RO-2.

Table RO-2. Miles of Road Maintenance Responsibility in 2002

National Forest	Miles
Boise	4,947
Payette	3,143
Sawtooth	1,919

The Forests' ability to maintain their road systems is dependent on a number of factors, including:

- Total miles of open roads,
- Allocated funding for road maintenance,
- Miles maintained through commercial activities, such as timber sale contracts,
- Allocated funding for road improvement projects to support other resources,
- Maintenance levels,
- Resource protection levels, and
- Recreation traffic levels.

Road maintenance budgets have fluctuated during the past 10 years. However, traffic volumes on the Forest road system have steadily increased. Because of fewer timber sales, commercial user contributions to road maintenance also have declined. This affects not only recurrent maintenance, such as seasonal blading, but also deferred maintenance such as long-term surface replacement. Local population growth has increased the burden on county-maintained road systems, while budgetary constraints have concentrated maintenance priorities on roads closer to urban areas. Consequently, not all roads have been maintained to the level prescribed in management objectives.

Funding has been well below that needed for to maintain the entire road system at operational maintenance level standards. As a result, roads are maintained on a priority basis. User safety, resource protection, and user comfort needs are used to prioritize roads for maintenance. The average miles of road maintained to standard per year are displayed in Table RO-3. Annual accomplishment reporting indicates that the Forests have achieved full maintenance standards on an estimated 19 to 22 percent of the transportation system across the Ecogroup area based on accomplishment reports for the three Forests for the period of 2000 to 2002.

Roads meeting identified long-term needs but not short-term needs are often placed in a Level 1 maintenance category. This level usually involves physical closure of the road for a period of one year or longer but not decommissioning, and these roads are not open for vehicle travel until needed again.

Table RO-3. Average Annual Road Maintenance[1]

National Forest	Miles of Road Maintained	Percent of Roads Maintained	Miles of Road Maintained to Standard	Percent of Roads Maintained to Standard
Boise	2,079	42%	1,072	21%
Payette	730	22%	636	19%
Sawtooth	531	29%	416	22%

[1] Based on a 3-year average from 2000 to 2002.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Laws, Regulations, and Policies – Numerous laws, regulations, and policies govern the management of recreation resources on National Forest System lands. These are listed in *Appendix H* to the Forest Plans.

Forest Plan Direction – Forest Plan guidelines require an analysis of long-term needs prior to decommissioning National Forest System roads during project level planning. This type of analysis would also be conducted prior to any major road construction or reconstruction.

General Effects

Road construction and reconstruction are usually associated with development related to timber harvest, utility lines, mineral and energy exploration and production, recreation facilities, and public safety. Most of the Forests' road needs for the current level of use are in place. Reconstruction, maintenance, and decommissioning of existing facilities are included within each alternative. Projections for new construction are much lower than was predicted for the previous planning period. Commercial use of the transportation system has declined in the 1990s and this trend is expected to continue, to some extent, in the coming decade. On the other hand, recreational traffic has increased substantially. This shift in traffic composition and user types is a driving force for development of new travel management philosophies and strategies.

New standards and guidelines have been developed to mitigate the impacts on natural resources resulting from the current road system and its increased use. Nationally, the trend in the 1990s has been to redirect maintenance funding to decommission unneeded roads and improve the maintenance conditions of those remaining. A smaller, more efficient transportation system is the expected outcome.

Road Improvements - Currently, there are ten roads within the Ecogroup area that are being considered for improvement under all alternatives. About half of these improvement projects would improve the standard above their current standard for only along 2 or 3-mile segments of these roads.

The other half of these projects range from 6 to 14 miles of improvement. These improvement projects are still in very preliminary stages of development and still need to be analyzed on a site-specific basis prior to project approval and implementation. Each road improvement project may change substantially or be dropped from further consideration as further information is gathered and considered. Accomplishment of these road improvements is very dependent on capital improvement funding within the agency. Priorities can also shift dramatically, for varied reasons, which may cause some projects to rise in priority or drop completely off the capital improvement list.

Recreation – Increasingly, national forest and other public lands are likely to be the destinations of choice for people looking for high-quality outdoor recreation experiences in natural settings. As populations grow and urban development expands, the use of Forest roads increases. The arterials and major collectors that connect the Forests to these areas will experience the most increased day-use traffic, particularly on weekends. This traffic will add to the maintenance work necessary to keep the roads in a safe and structurally sound condition. Continued growth in recreation use without increases in the road system will likely lead to lower visitor satisfaction and more conflicts between users. New road construction for recreation purposes is expected to be very low to none, and would not vary by alternative.

Restoration Activities – Restoration activities include a broad array of management activities including timber harvest, road construction, reconstruction and decommissioning, prescribed fire, facility relocation and modification, fish habitat improvement, streambank stabilization, slope stabilization, and mining reclamation. The effects that some of these activities may have on the transportation system are described in greater detail, below.

Timber Harvest – Historically, most Forest roads were constructed for timber management purposes. Today, timber management is still a significant contributor to the need for new road construction, although this need has declined due to a combination of reduced harvest and improved helicopter logging technology. The Forests' ability to decommission roads is also linked, to some extent, to timber sales in that funds gained through timber sales are frequently also used to decommission roads within the sale area. Road decommissioning is also funded by watershed restoration, minerals, and other sources. Timber management has historically also been a significant contributor to road maintenance activities on the three Forests. Timber sale purchasers are usually required to perform recurrent road maintenance during timber hauling operations or post cash deposits in lieu of performance in the case of some small sales. Deferred maintenance deposits are also collected from timber sale purchasers in most cases. These road maintenance contributions have been historically higher on the Boise and Payette National Forests than the Sawtooth due to their higher levels of past timber management development.

Mineral and Energy Exploration, Development, and Reclamation – Road development is often associated with mineral and energy exploration and development activities. Given recent levels of these activities, little or no road development is anticipated for all of the alternatives. A site-specific analysis would be needed prior to final approval of any road development for these purposes. Reclamation activities may include re-opening closed roads or re-construction of existing ones for temporary or short-term access needs. In that the level of mineral exploration and development is largely driven by market forces and regulated by existing mining law, there would be little difference between the alternatives in effects on the roads. Reclamation activities may vary depending on differences in alternative restoration emphasis.

Utility Developments – These include pipelines and overhead powerlines that can potentially require road construction or reconstruction for the installation and/maintenance of developed facilities. In some cases, helicopters can be used effectively to reduce new road construction needs. Little or no road construction and reconstruction associated with utility development is anticipated for all alternatives.

Telecommunications Sites – Sites include communications developments that can potentially require road construction or reconstruction for the installation and/maintenance of developed facilities. In some cases, helicopters can be used effectively to reduce new road construction needs. Little or no road construction and reconstruction associated with telecommunication site development is anticipated for all alternatives. A site-specific analysis would be needed prior to final approval of any telecommunications site development.

Fish and Wildlife Habitat Protection and Watershed Improvement – These management activities can include both road management and road improvement activities done for watershed restoration. In some cases, road management measures reduce access where wildlife habitat or watershed improvement is emphasized. Some roads are closed or decommissioned upon conclusion of the primary purpose activities, while others are managed with seasonal closures in an effort to protect wildlife or their habitat. Usually, these considerations are made during project planning as part of determining transportation system needs for project implementation.

Road improvements done for fisheries and watershed restoration can include a variety of road-related activities such as culvert replacements and road re-alignments. Generally, these road improvements are designed to reduce impacts, such as sediment delivery from existing roads to fish and watershed values.

Direct and Indirect Effects by Alternative

Indicator 1 - Anticipated Changes to the Classified Road System

The projected total miles of the classified road system on each Forest by 2015 is shown in Table RO-4. These figures were developed using decadal averages for the first two decades from the Spectrum ASQ model and do not reflect any shifts to state or county jurisdiction. As such, they are not meant to be accurate in terms of specific road mileages, but rather are useful for comparing relative differences between alternatives. They are also not spatial and do not correspond with any specific geographic locations. These estimates reflect the total miles of classified road system that would be available to meet all resource objectives based on road construction and decommissioning assumptions used in the model. They reflect the anticipated results of management direction associated with the MPC assignments of each alternative. They do not reflect seasonal closures for resource protection or maintenance level 1 closures. Thus, they are not necessarily the miles that would be open for public use. Access is determined though site-specific decisions that may limit or restrict access to protect resource values.

Table RO-4. Projected Miles of Classified Roads in 2015

National Forest	Current Miles	Estimated Road Miles by Alternative						
		Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	5,496	5,285	5,144	4,928	5,197	5,252	5,364	5,206
Payette	3,197	3,326	3,271	3,328	3,195	3,339	3,182	3,294
Sawtooth	2,019	2,024	2,013	2,008	2,018	2,030	2,019	2,016

The decommissioning focus varies by Forest. With its relatively high level of classified roads and classified road densities, the majority of the decommissioning work on the Boise has focused on classified roads. On the Payette and Sawtooth, most decommissioning effort has been directed towards unclassified roads, which frequently present greater levels of impact than classified roads that are constructed to much higher standards. The Payette and Sawtooth also have more complete inventories of their unclassified roads, facilitating their incorporation into project-level analyses.

Under every alternative, some level of road construction, reconstruction, and decommissioning would be likely to occur. New roads will continue to be built, as needed and approved, while others are decommissioned as approved. Levels of new road construction and decommissioning fluctuate on a yearly basis due to a number of factors, including fluctuations in funding and project-level implementation schedules. In most years of the recent past, decommissioning miles have usually exceeded new construction miles due largely to efforts to reduce road-related effects on aquatic resources. Usually, classified roads that are decommissioned are local roads rather than arterial or collector roads. This is due to a number of factors, including that arterial and collectors are relatively fewer in number, receive significantly higher traffic levels, and provide access to developed facilities or serve as vital transportation links between state and county roads.

Anticipated levels of both new road construction and decommissioning are the lowest in Alternatives 4 and 6 due to a low level of management activities. The resultant road systems under those alternatives would show relatively low levels of change in overall miles from the current system.

Because the level of anticipated decommissioning exceeds the level of anticipated new road construction on the Boise, the total miles of roads on the Forest would decrease under all alternatives. The resulting transportation network would contain fewer roads but would provide higher standards of maintenance and levels of service to accommodate the increasing traffic, while providing higher levels of protection to sensitive resources. With its high level of classified roads, most road decommissioning on the Boise has been focused on classified roads. With their emphasis on restoration management, Alternatives 3 and 2 would be likely to result in the greatest levels of reductions to the current system, with Alternative 3 having the greatest reduction. Alternatives 4 and 7 would both have moderate levels of road system reductions. Alternatives 1B and 5 would provide the second and third smallest reductions of roads on the Boise, respectively. Alternative 6 would result in the least amount of change from the current road system because of relatively low levels of both new construction and decommissioning.

The classified road system on the Payette both expands and contracts under the alternatives. It expands to varied levels under Alternatives 5, 1B, 7, 2, and 3, with Alternative 5 resulting in the largest road system increase and Alternative 3 providing the smallest. Given recent history and resource conditions, the levels of road system expansion on the Payette are probably exaggerated. However, the relative relationships between the Alternatives are probably still valid. The road system contracts slightly under Alternative 4 and to a larger extent under Alternative 6.

The scale of change is somewhat less for the Sawtooth than for the Boise and Payette due to its smaller road system and lower level of timber sale (i.e., new road construction) opportunities. Relatively little change to the classified road system would be expected for the Sawtooth under any alternative. The road system would be expected to expand slightly under Alternatives 5 and 1B, with 5 showing the greatest increase. Conversely, it would be reduced the most under Alternative 3. Smaller reductions would likely occur under Alternatives 2, 4, and 7. Levels of new construction and decommissioning are expected to be about the same under Alternative 6, keeping the projected road system about the same as its current level.

Indicator 2 - Anticipated Changes to the Unclassified Roads

The analysis presented above addresses changes to the classified road system. Unclassified roads are typically created by recreational users when they drive off of classified roads to access a fishing or camping site, retrieve game, test driving skills on hillsides, and for many other reasons. These travelways were never designed, constructed or maintained to any standard. Quite often, they are pioneered in sensitive areas such as riparian areas and, with repeated use, typically result in more resource damage than classified roads.

Unclassified roads are usually analyzed during watershed analysis or project-level analysis to determine their associated resource impacts, their historical significance, or if they are needed. If they are needed, they are usually incorporated into the classified road system and appropriate management and maintenance are assigned. If not needed, a decision to decommission and rehabilitate them is usually made. In recent years, much of the road decommissioning effort has focused on unclassified roads. Based on averages for the past three years for the Ecogroup Forests, an estimated 59 percent of the roads that have been decommissioned were unclassified roads. This percentage is higher on the Payette (79 percent) and Sawtooth (85 percent) than the Boise (15 percent). As such, the analysis for classified roads above under-represents the overall decommissioning levels and emphasis on the Payette and Sawtooth National Forests.

Each Forest of the Ecogroup is at a different level in their inventory of unclassified road, but none of the three Forests has a complete inventory of the unclassified roads that exist. As a result, the total miles of existing unclassified road on each Forest is not known, making an analysis similar to that done for classified roads difficult. However, the above percentages can be analyzed in combination with Spectrum decommissioning estimates for each alternative to estimate relative levels of unclassified road decommissioning under each alternative. These estimated levels are displayed in Table RO-5.

Table RO-5. Estimated Miles of Unclassified Roads Decommissioned by 2015

National Forest	Decommissioned Unclassified Road Miles by Alternative						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	62	104	122	60	74	29	74
Payette	194	224	370	117	220	83	200
Sawtooth	37	80	118	21	47	13	68

Rankings by Forest for the alternatives are the same with only a couple minor exceptions. For all three Forests, decommissioning of unclassified roads is likely to be the most aggressive under Alternative 3, which would likely result in the highest level of unclassified road decommissioning. Alternative 2 would follow Alternative 3. This is consistent with the emphasis on restoration activities and the levels of assignments of restoration prescriptions in Alternative 2. Alternatives 5, 7, and 1B present relatively moderate levels of decommissioning for the three Forests. Alternative 4 also presents moderate level on the Boise but is relatively lower on the Payette and Sawtooth. Alternative 6 offers the lowest levels of decommissioning for all three Forests. It is also likely that under any alternative, decommissioning unclassified roads is likely to continue in areas where strong resource concerns exist. Opportunities for travel and access on low-standard roads will likely decrease in such areas.

Anticipated effects to recreational access are more specifically analyzed and addressed in the *Recreation* section of this chapter.

Indicator 3 - Road Maintenance Capabilities

As noted above, road maintenance capabilities are affected by a number of variables. Because budget allocations vary from year to year and Forest to Forest, it is difficult to predict final budget allocations. Also, there is no direct linkage between stated Forest Plan budget needs and what Congress eventually allocates, so there is no assurance that final budget levels will even approach those stated in Forest Plans. Recent maintenance performance levels can be used in combination with anticipated road system levels to estimate the relative percent of the road system that could be maintained under each alternative. This does not account for road maintenance contributions from commercial users or road maintenance cooperators. However, commercial road maintenance contributions are currently relatively small. Based on each alternative’s relative levels of mechanical vegetation treatments, Alternatives 3 and 5 would probably provide greater road maintenance contributions from commercial users. Alternatives 2, 7, and 1B would provide similar levels, while Alternatives 4 and 6 would provide the lowest levels. Road maintenance cooperator contributions would probably vary little by alternative and would also be relatively small. Table RO-6 represents the anticipated level of road maintenance to operational maintenance level standards that would be accomplished by the Forest Service alone, given road maintenance accomplishment levels comparable to those of 2000, 2001, and 2002.

Table RO-6. Percentage of Anticipated 2015 Road System Maintained to Standard Based on Road Maintenance Accomplishment Levels in 2000, 2001, and 2002

National Forest	% Roads Maintained to Standard by Alternative						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	20.3%	20.8%	21.7%	20.6%	20.4%	20.0%	20.6%
Payette	19.1%	19.4%	19.6%	19.9%	19.0%	20.0%	19.3%
Sawtooth	20.6%	20.7%	20.7%	20.6%	20.5%	20.6%	20.6%

In that the projected road systems for each Forest vary by 436 miles or less, only relatively slight differences occur between alternatives. This is especially true for the Sawtooth National Forest whose classified road system is expected to vary little under any of the alternatives. In general, maintenance responsibilities are proportional to the size of the classified road system. This analysis assumes a static road maintenance funding level. Since Alternative 5 is likely to result in the largest road system on the Payette and Sawtooth, it should result in the lowest percentage of roads maintained to standard. This is also the case under Alternative 6 on the Boise. Conversely, Alternative 3 is likely to result in the smallest road system on the Boise and Sawtooth while Alternative 6 results in the smallest road system on the Payette. These alternatives on the respective Forests are likely to result in the highest percentages of roads maintained to standard.

The above results will be improved, to some extent, by commercial user contributions, which are not estimated in this analysis. Commercial user contributions would contribute to meeting road maintenance standards and would be likely to be proportional to the levels of mechanical treatments under each alternative. In this regard, road maintenance capabilities under Alternatives 5 and 3 would probably benefit to the greatest extent. However, such performance improvements are not expected to be substantial.

Cumulative Effects

As populations grow and urban development expands near the Ecogroup Forests, the use of Forest roads will increase. The Forest arterials and major collectors that connect the Forests to these areas will experience the most increased day-use traffic, particularly on weekends. This traffic adds to the maintenance work necessary to keep the roads in a safe and structurally sound condition.

As travel to and through the Forests increases, there will be an increase in impacts to surrounding public roads. County roads will be affected the most, as they generally are not constructed to withstand high traffic volumes. Congestion during peak summer travel months may increase on State Highways 55, 21, and 75, as well as U.S. Routes 93, 20, and 95 and U.S. Interstate 84. Timber sale litigation has reduced commercial forest products traffic to well below what was expected under the original Forest Plans, especially on the Boise and Payette. The level of commercial forest products traffic is expected to increase under most alternatives above current levels however, these levels would still be likely to be somewhat lower than original Forest Plan levels.

The Forest Service is required by law to provide reasonable access to private inholdings. As ownership of these lands has changed in recent years, more interest in developing them for second homes or developed recreation areas has been seen. Pressure on the Forests to provide more than the historical, primitive, or low-standard road access increases. It usually is in the interest of the Forest Service to request that a public transportation authority, such as the local county government, accept responsibility for management and maintenance of roads that provide access to multiple private inholdings.

Inventoried Roadless Areas

INTRODUCTION

Inventoried Roadless Areas (IRAs) are inventoried tracts of National Forest System land characterized as having an undeveloped character. On the Boise, Payette, and Sawtooth National Forests, IRAs were initially identified during the Roadless Area Resource Evaluation of 1972 (also known as RARE I) and the RARE II of 1979. These inventories were updated and areas were re-evaluated for wilderness suitability as part of the initial forest planning efforts completed on these three National Forests in 1990, 1988, and 1987, respectively. As part of the current Forest Plan revision process on these Forests, the inventories were further reviewed, updated, and evaluated.

Future management of roadless areas is a controversial and polarized issue. On many National Forests, roadless area management has been a major point of contention in land management planning. Roadless areas are valued for many resource benefits including their undeveloped fisheries and wildlife habitat, biological diversity, and dispersed recreation opportunities. Controversy continues to accompany most proposals to harvest timber, build roads, or otherwise develop inventoried roadless areas. Public opinions regarding the use of these areas vary greatly, ranging from full commodity development to maintaining undeveloped character through wilderness designation.

Management direction for IRAs has also been proposed and analyzed on a national scale through a combination of several policy rules initiated during the Clinton administration. In response to the national controversy over roadless area management, the Interim Roads Rule (*Administration of the Forest Development Transportation System: Temporary Suspension of Road Construction and Reconstruction in Unroaded Areas; Interim Rule; 36 CFR Part 212; 64 Federal Register 7290; February 12, 1999*) suspended road construction and reconstruction in certain inventoried roadless areas for 18 months (March 1999 through August 2000). The Roadless Area Conservation Rule (*Special Areas; Roadless Area Conservation; 36 CFR Part 294; 66 Federal Register 3244; January 12, 2001*) prohibited road construction and reconstruction in most inventoried roadless areas and outlined procedures to evaluate the quality and importance of roadless characteristics. The rule was originally scheduled to take effect on March 12, 2001; however, the Secretary of Agriculture extended the effective date until May 12, 2001, to permit the new Administration to review the rule.

On May 10, 2001, the Idaho District Court granted a preliminary injunction requested in Kootenai Tribe of Idaho v. Veneman and State of Idaho v. U.S. Forest Service, enjoining the Forest Service from implementing “all aspects of the Roadless Area Conservation Rule.” The Court’s decision to grant a preliminary injunction was appealed and brought before the Ninth Circuit Court of Appeals. On June 7, 2001, the Chief of the Forest Service and Secretary of Agriculture issued a letter concerning interim protection of inventoried roadless areas, stating that: “the Forest Service is committed to protecting and managing roadless areas as an important component of the National Forest System. The best way to achieve this objective is to ensure that we protect and sustain roadless values until they can be appropriately considered through forest planning." (Bosworth 2001). On December 12, 2002, the Ninth Circuit Court of Appeals reversed the May 10, 2001, ruling by the U.S. District Court for the District of Idaho, which enjoined the Department from implementing the Roadless Area Conservation Rule. The Forest Service is currently working with the USDA Under Secretary for Natural Resources and Environment and the Department of Justice to review the decision.

As described in Chapter 1, one of the decisions made through Forest Planning is the identification of areas recommended for wilderness designation. The Forest Service can only make recommendations to Congress (via Forest Plans) for IRAs to become wilderness, and only Congress can designate wilderness through the legislative process. Recommendations and designations are often controversial, and actual designations may take numerous years to pass Congress. Congress may also change recommended wilderness boundaries based on public comments, political issues, or other factors.

In past Forest Planning efforts, the Forests of the Southwest Idaho Ecogroup (Ecogroup) evaluated almost 3,216,000 acres in 75 IRAs for possible recommendation for wilderness designation by Congress. Of this total, nearly 651,000 acres were recommended for wilderness designation; about 1,241,000 acres were assigned management prescriptions that at least partially preserved their undeveloped character; and 1,324,000 acres were assigned management prescriptions that allowed for development. In this Forest Plan revision process, a total of 78 IRAs comprising approximately 3,591,000 acres are evaluated for recommendation for wilderness designation. Of the 3,591,000 acres evaluated, approximately 3,234,000 acres lie within the Ecogroup Forests and represent almost 49 percent of the total area comprised by the three Forests. Portions of two additional IRAs that were not included in the wilderness recommendation evaluation also lie within the Ecogroup. These are relatively small portions of two IRAs for which the Salmon-Challis National Forest is the lead Forest for Wilderness evaluation, and they comprise about 8,000 acres.

While a management allocation may allow development activities such as timber sales in a roadless area, it does not require it. Such activities may be proposed, but must be further evaluated in site-specific NEPA analysis prior to approval and implementation. Existing wilderness areas are discussed in detail in the *Wilderness* section of this Chapter.

Analysis of Inventoried Roadless Areas is divided among three separate sections of the EIS and the associated appendices. This section of the EIS analyzes the effects of each alternative on IRAs collectively on each Forest. Wilderness recommendation evaluations for individual IRAs are presented in *Appendix C*. The effects of each alternative on wilderness characteristics and the disposition of each IRA under each alternative are also analyzed for each IRA in *Appendix C*. Evaluations of the roadless area characteristics are presented for each IRA in *Appendix H.*

Roadless Inventory Criteria

Criteria for determining whether an area of National Forest System land qualifies as an Inventoried Roadless Area are provided in Forest Service Handbook 1909.12, which states:

> "Roadless areas qualify for placement on the inventory of potential wilderness if, in addition to meeting the statutory definition of wilderness, they meet one or more of the following criteria:

1. They contain 5,000 acres or more.
2. They contain less than 5,000 acres but:
   a. Due to physiography or vegetation, they are manageable in their natural condition.
   b. They are self-contained ecosystems such as an island.
   c. They are contiguous to existing wilderness, primitive areas, Administration-endorsed wilderness, or roadless areas in other Federal ownership, regardless of their size.
3. They do not contain improved roads maintained for travel by standard passenger-type vehicles, except as permitted in areas east of the 100th meridian."

Despite their name, Roadless areas ***can*** contain low-standard "roads". As noted above under the third criteria, only roads that are improved and maintained are excluded from IRAs. As such, classified roads and other roads that were designed, constructed, and maintained for access or resource management needs are generally excluded from IRAs. However, a number of IRAs within the Ecogroup area contain user-created "roads" or "travelways" that were never designed, planned, physically constructed, or maintained. Many people think of these travelways as "roads" and are confused when the surrounding area is referred to as "roadless". In this regard, the "Roadless" appellation is, in some cases, a somewhat confusing misnomer.

Inventoried Roadless Areas also generally do not contain structures, improvements, or obvious landscape alterations that would indicate the presence or influences of man. These might include overhead power transmission line corridors, airstrips, electronic communication installations, timber harvest units where logging activity is evident, and other forms of development. These types of facilities and cultured landform features are usually excluded from IRAs when defining IRA boundaries.

Issues and Indicators

Issue 1 Statement – Forest Plan management strategies may affect the capability for development or the wilderness potential of existing Inventoried Roadless Areas.

Background to Issue 1 – Public comments on how to manage the Ecogroup roadless areas were highly polarized between allowing development of IRAs or leaving them in an undeveloped or potential wilderness condition. Those in favor of development felt that leaving roadless areas undeveloped limits recreation access and reduces contributions to local economic stability.

Designation of additional areas as recommended wilderness further restricts potential uses and access. Other people felt that developing roadless areas represents a potential loss of undeveloped or candidate wilderness areas, primitive recreation experiences, and valuable wildlife, fish, and plant habitat.

To address these concerns, the analysis shows, by alternative, how the Forest Service proposes to manage the current Inventoried Roadless Areas within the Ecogroup area. Essentially, four different outcomes can potentially result from Management Prescription Categories (MPCs) assigned to IRAs. These are: (1) recommended wilderness, (2) maintain undeveloped character, (3) potential low levels of development, or (4) available for a full range of development. The social and economic trade-offs associated with the alternatives are assessed in the *Socio-economic Environment* section of Chapter 3, and in *Appendix C*.

Issue 1 Indicators - The following indicators will be used to measure the potential effects of management strategies on roadless areas of the three Forests by alternative. The indicators are intended to show relative differences between the alternatives, rather than to represent the actual acres or percentages of treatments that are expected to occur. Treatment areas would not equal MPC acres, but would be a much smaller portion based on management priorities, funding opportunities, and project-level planning decisions within the planning period.

- *Acres of IRAs assigned to management prescriptions (MPCs 2.4, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, or 8.0) that allow a full range of development opportunities* – This indicator reflects the potential area within IRAs that could be developed over the long-term by management activities under each alternative. This development might include such activities as timber harvest, road construction, rangeland improvement chainings, or developed recreation sites. The level of development would be expected to change the roadless status of the IRA.

- *Acres of IRAs assigned to management prescriptions (MPCs 3.1, 3.2, 4.1b, 4.1c) that have the potential for low levels of development* – This indicator reflects the potential area within IRAs that could receive relatively low levels of vegetation management by alternative. This management might include such activities as habitat restoration, timber salvage, or treatments to reduce the hazard of insect infestation or uncharacteristic wildfire. The level of development would not necessarily be sufficient to change the roadless status of the IRA.

- *Acres of IRAs assigned to management prescriptions (MPCs 2.1-Wild, 2.2, 4.1a) that maintain their undeveloped roadless character* – This indicator reflects the area within IRAs that would remain undeveloped by management activities under each alternative.

- *Acres of IRAs assigned to a management prescription (MPC 1.2) that recommends the area for wilderness designation* – This indicator reflects the area within IRAs that would be recommended for wilderness designation under each alternative. This area would also remain undeveloped by management activities.

For the cumulative effects analysis, acres of undeveloped IRAs and recommended wilderness are used in conjunction with existing wilderness acres to show the relative amount and distribution of areas potentially withdrawn from development at the Ecogroup and statewide levels. In that full information for the above indicators is not available for every National Forest in Idaho, the indicators are:

- *Acres within IRAs that allow road construction and reconstruction*.
- *Acres within IRAs that do not allow road construction and reconstruction*.
- *Acres within IRAs recommended for wilderness designation*.

Although these indicators do not reflect management prescriptions that would allow for timber harvest and other forms of development without constructing new roads, they do represent the majority of the potential for development.

Issue 2 Statement – Forest Plan management strategies for existing Inventoried Roadless Areas may affect the capability to treat forest health problems.

Background to Issue 2 – A national issue that has risen to prominence since the DEIS has centered on the condition of much of the nation's National Forests relative to susceptibility for uncharacteristic wildfires. The Forest Service's National Fire Plan was developed in response to this growing issue. Although forest health problems occur within both developed and undeveloped areas in National Forests, much of the debate has focused on IRAs where the agency's ability to treat problem areas may be hampered by reduced access and treatment options. Given the large proportion of National Forest System lands comprised by IRAs, concern exists that the overall effectiveness in addressing forest health problems would be greatly limited unless areas within IRAs can also be effectively treated.

A number of public comments suggested the need to be able to address forest health problems within IRAs through active management of forest stands within IRAs. This would involve using management actions including prescribed fire, mechanical vegetation treatments and, where needed for access, new road construction. They felt that insect, disease, and uncharacteristic wildfire threats could not be contained by only treating areas outside of IRAs and that active treatment capabilities should extend within IRAs as well. Other comments expressed that important resources within IRAs were less threatened when managed under a strategy that greatly limits new road construction and mechanical vegetation treatments. Those in favor of actively managing IRAs felt that leaving roadless areas unmanaged inhibits forest restoration capabilities as well as the ability to address forest health problems. Other people felt that active management in roadless areas represents a potential loss of valuable wildlife, fish, and plant habitat. They believe that undeveloped areas represent the best opportunity to protect species viability, scenic quality, habitat connectivity, biological diversity, aquatic strongholds and ecosystems, and primitive recreation opportunities.

Issue 2 Indicators – The ability to address forest health problems involves two elements: the treatments and access that are available to managers in areas in need of treatment. These two elements vary depending on the MPCs that are assigned. In this analysis, MPCs assigned to IRAs under each alternative are compared from the perspective of treatments and access allowed by the assigned management prescriptions. The analysis focuses on the portions of IRAs where forest health problems and the need for treatments are likely to exist. These include areas having high or extreme uncharacteristic wildfire hazard ratings, high or extreme ratings for resistance to control, or high insect hazard ratings.

The following indicators will be used to measure the potential effects of management direction for IRAs to affect capabilities to address forest health problems by alternative.

- *Acres within IRAs having high or extreme uncharacteristic wildfire hazard ratings, high or extreme ratings for resistance to control, or high insect hazard ratings assigned to prescriptions (MPCs 2.4, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 8.0) that would allow both a full range of treatments and access capabilities* – This indicator reflects the level of areas within IRAs where the range of allowable vegetation treatment options is the largest and where access capabilities are the least restricted under each alternative.

- *Acres within IRAs having high or extreme uncharacteristic wildfire hazard ratings, high or extreme ratings for resistance to control, or high insect hazard ratings assigned to prescriptions (MPCs 3.2, 4.1b, and 4.1c) that would limit access capabilities but allow a wide range of treatments* – This indicator reflects the level of areas within IRAs where the range of allowable vegetation treatment options is still relatively extensive but where access capability are highly limited, with little or no new road construction allowed under each alternative.

- *Acres within IRAs having high or extreme uncharacteristic wildfire hazard ratings, high or extreme ratings for resistance to control, or high insect hazard ratings assigned to prescriptions (MPCs 1.2, 2.1, 2.2, 3.1, and 4.1a) that would limit both the range of treatments available as well as access capabilities* – This indicator reflects the level of areas within IRAs where the range of allowable vegetation treatment options is highly limited with little or no mechanical treatments, and where access capabilities are highly limited, with little or no new road construction allowed under each alternative.

For the cumulative effects analysis, the values for the above indicators are combined and presented for the entire Ecogroup area to provide a broader perspective.

Issue 3 Statement – Forest Plan management strategies for Inventoried Roadless Areas may or may not be consistent with the direction established under the Roadless Area Conservation Rule.

Background to Issue 3 – A large number of public comments supported the adoption of management direction to protect IRAs that would be consistent with the Roadless Area Conservation Rule.

Conversely, other comments were strongly opposed to the adoption of the Roadless Area Conservation Rule.
This issue is addressed by the alternatives in that Alternative 6 was designed to encompass direction that was expected to result from the Roadless Area Conservation Rule. Management direction for IRAs was specifically designed in this alternative to maintain the roadless and undeveloped character of each IRA. Similar management direction within IRAs is present, to varied extent, in all the other alternatives as well. The analysis shows, by alternative, the varied levels of management direction consistent with the Roadless Area Conservation Rule in each alternative.

Issue 3 Indicators - The following indicator will be used to measure each alternative's consistency with the Roadless Area Conservation Rule:

- *Acres of IRAs assigned to management prescriptions (MPCs 1.2, 2.2, and 4.1a) that are consistent with direction established by the Roadless Area Conservation Rule* – This indicator reflects the potential area within IRAs for management actions that would maintain conditions that would be consistent with those prescribed under the Roadless Area Conservation Rule. Any activities would not be likely to change the roadless status of the IRA.

- *Acres of IRAs assigned to management prescriptions (MPCs 2.4, 3.1, 3.2, 4.1b, 4.1c, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, or 8.0) that are not consistent with direction established by the Roadless Area Conservation Rule* – This indicator reflects the potential area within IRAs for management actions that would not be permitted under the Roadless Area Conservation Rule. These management actions include a wide array of potential activities such as road construction, timber salvage, special uses developments, and treatments to reduce the hazard of insect hazard or uncharacteristic wildfire. The activities could potentially change the roadless status of the IRA.

Issue 4 Statement – Management strategies for recommended wilderness may affect recreation opportunities and experiences within recommended wilderness areas as well as the potential for wilderness designation of those areas.

Background to Issue 4 – Public comments indicate that some people believe that allowing motorized uses within recommended wilderness is inconsistent with Forest Service stated management direction to maintain wilderness values, including opportunities for solitude and primitive experiences. Some feel that the noises created by motorized use as well as the use of mechanized equipment itself eliminates these opportunities and is thereby inconsistent with the management direction. Others also feel that allowing any form of mechanical transport including non-motorized forms such as mountain bicycling, creates the potential to establish a pattern of non-conforming use that builds a constituency for mechanized use of these areas, thereby threatening the chances for Wilderness designation.

On the other side of this issue, some suggest that areas that are not designated as Wilderness should not be managed as Wilderness, while others voiced concern that there were already too many restrictions regulating motorized use of the Forests.

This issue is addressed by the alternatives in that the use of mechanical transport within recommended wilderness is prohibited under Alternatives 4 and 6. Mechanical transport includes both motorized and non-motorized uses such as motorcycling, snowmobiling, mountain bicycling and other non-motorized mechanized equipment such as game carts, hang gliders, backcountry in-line skates, and skateboards. Prohibited uses were expanded to include mechanized uses because mechanized uses pose the same potential threat of establishing non-conforming use patterns that may threaten the chances for wilderness designation. The analysis shows, by alternative, the effects of this shift in these alternatives.

Issue 4 Indicators - The following indicators will be used to measure the potential effects of management direction on recreation opportunities and experiences within recommended wilderness areas, as well as the potential for wilderness designation of those areas on the three Forests by alternative. In that travel regulations for cross-country and trail use can differ, separate indicators are used to measure effects by alternative on mechanized use opportunities in recommended wilderness areas.

The following indicators are used to contrast the relative levels of both motorized and mechanized use opportunities offered by the alternatives for cross-country travel experiences.

- *Acres Open to Summer Cross-Country Motorized Uses*.
- *Acres Open to Summer Cross-Country Mechanized Uses*.
- *Acres Open to Winter Cross-Country Motorized Uses*.

The following indicators are used to contrast the relative levels of both motorized and mechanized use opportunities offered by the alternatives for on-trail experiences.

- *Miles of Summer Trail Open to Motorized Uses*.
- *Miles of Summer Trail Open to Mechanized Uses*.

The following indicators are used to contrast the relative levels of groomed snowmobile and cross-country ski trails under each of the alternatives. Groomed cross-country ski trails are included because they require the use of motorized equipment for grooming and may also be affected by management direction limiting motorized uses. This analysis assumes that there would be no new groomed trails and only closures of existing ones due to recommended wilderness management direction associated with Alternatives 4 and 6.

- *Miles of Groomed Snowmobile Trails*.
- *Miles of Groomed Cross-Country Ski Trails*.

For cumulative effects analysis, a broader perspective is appropriate and the following indicators will be used.

- *Percent of Forest Closed to Summer Cross-Country Motorized Uses*.
- *Percent of Forest Closed to Summer Cross-Country Mechanized Uses*.

- *Percent of Forest Closed to Winter Cross-Country Motorized Uses*.

The indicators listed above are used to display differences among the alternatives in relative levels of restrictions on the use of mechanical transport for cross-country travel anticipated for each Forest. Inherently, they also reflect the balance between areas allowing motorized and mechanized cross-country travel and areas that do not, beyond recommended wilderness areas.

The following indicators are used to display differences, among the alternatives, in relative levels of restrictions on the use of mechanical transport for on-trail experiences anticipated for each Forest. Inherently, they also reflect the balance between trails allowing motorized and mechanized travel and those that do not, beyond recommended wilderness areas.

- *Percent of Summer Trail Miles Closed to Motorized Uses*.
- *Percent of Summer Trail Miles Closed to Mechanized Uses*.

The following indicators are used to contrast the relative levels of groomed snowmobile and cross-country ski trails under each of the alternatives for each Forest to provide a broader scale beyond recommended wilderness areas. Groomed cross-country ski trails are included because they require the use of motorized equipment for grooming and may also be affected by management direction limiting motorized uses. The analysis assumes that there would be no new groomed trails and only closures of existing ones due to recommended wilderness management direction associated with Alternatives 4 and 6.

- *Percent of Current Level of Groomed Snowmobile Trails*.
- *Percent of Current Level of Groomed Cross-Country Ski Trails*.

Affected Area

Issue 1 - The affected area for direct and indirect effects to roadless and undeveloped areas are the IRAs of the three National Forests within the Ecogroup. In that evaluation for wilderness recommendation requires that an entire IRA be evaluated regardless of administrative boundaries, portions of six IRAs on adjacent, non-Ecogroup Forests are also included in the affected area. These areas represent the National Forest System lands where potential wilderness and undeveloped areas exist, as well as where land use allocations might alter or maintain those areas. The roadless and undeveloped public lands, as well as the designated wilderness areas, in both the Ecogroup Forests and the State of Idaho as a whole, best represent the affected area for cumulative effects. Because wilderness designations are made on a statewide basis, this expanded area is appropriate to analyze the potential cumulative effects to those lands.

Issue 2 - The portions of IRAs within the Ecogroup area having high or extreme uncharacteristic wildfire hazard ratings, high or extreme ratings for resistance to control, or high insect hazard ratings comprise the affected area for assessing each alternative's capability to address forest health problems within IRAs. These areas represent the portions of IRAs where forest health problems are most likely to be present, as well as where assigned management prescriptions could determine treatments in those areas. The combined portions of IRAs within the Ecogroup area having high or extreme uncharacteristic wildfire hazard ratings or high insect hazard ratings best represent the affected area for cumulative effects.

Issue 3 - The IRAs of each of the three National Forests within the Ecogroup area comprise the affected area for determining consistency with the Roadless Area Conservation Rule. These areas represent the National Forest System lands where the Roadless Area Conservation Rule would be applied, as well as where land use allocations might alter or maintain those areas. The combined IRAs within the Ecogroup area best represent the affected area for cumulative effects.

Issue 4 – The affected area for direct and indirect effects on recreation opportunities is the area recommended for wilderness designation on the three National Forests within the Ecogroup. These areas represent the National Forest System lands where interim management direction associated with two of the alternatives would potentially change recreation opportunities and experiences. The affected area for cumulative effects is best represented by all the National Forest System lands within the Ecogroup area. This provides a broader context to analyze the balance between mechanized and non-mechanized opportunities and experiences associated with each alternative.

CURRENT CONDITIONS

Tabular data for IRA and recommended wilderness acreages displayed in this section reflect new area determination techniques and IRA boundary changes that have occurred since the current Forest Plans were written. As such, acreages vary from those listed in the current Forest Plans.

Inventoried Roadless Areas

A total of 80 IRAs are distributed across the Ecogroup area, comprising approximately 3,242,000 acres of undeveloped area. Cumulatively, this acreage represents almost half of the Ecogroup Forest land base. Total IRA acreages and percent of each Forest within IRAs are shown in Table IRA-1.

Table IRA-1. Ecogroup Inventoried Roadless Areas

IRAs	Boise NF	Payette NF	Sawtooth NF
Number of IRAs	42	22	25
Estimated Acres of IRAs*	1,108,500	908,500	1,225,100
% Of Forest within IRAs	50%	40%	58%

*Acreages include only Ecogroup portions of IRAs and are rounded to the nearest 100 acres.

These areas provide a range of primitive and semi-primitive recreation opportunities. These opportunities vary depending on such factors as size, shape, remoteness, and features of the area that are noted in the individual IRA descriptions in *Appendix C*. These factors also influence the current levels of recreational use for these areas, which vary greatly. However, overall IRA recreation levels are relatively low compared to the use that is occurring in roaded and developed areas that offer much easier access and a greater variety of amenities and services, such as ski areas, campgrounds, boating facilities, and lodges.

The IRAs also provide an array of other resource benefits including their undeveloped fisheries and wildlife habitat, biological diversity, and sources for municipal and high-quality water. Many of these benefits are presented in the individual IRA descriptions in *Appendix C* as well as the IRA information contained in *Appendix H.* Maps showing the IRAs on each Forest can be found in the maps packet and *Appendix C* of this EIS.

Eight IRAs extend beyond Ecogroup Forest boundaries into the Salmon-Challis and Nez Perce National Forests. The portions of these IRAs on adjacent Forests amount to a total estimated 469,000 acres. When an IRA covers lands on more than one National Forest, a lead Forest determination is made for evaluation for wilderness designation. IRAs for which the Ecogroup Forests do not have the lead will be re-evaluated in separate planning processes. Shared IRAs and the lead Forest determination are displayed in Table IRA-2.

Table IRA-2. Externally Shared Inventoried Roadless Areas

Roadless Area	Ecogroup Forest (Acres)	Other Forest (Acres)	Lead Forest
Rapid River	Payette (57,676)	Nez Perce (20,846)	Payette
Loon Creek	Sawtooth (3,157)	Salmon-Challis (106,373)	Salmon-Challis
Hanson Lakes	Sawtooth & Boise (57,567)	Salmon-Challis (13,533)	Sawtooth
Boulder-White Cloud	Sawtooth (322,732)	Salmon-Challis (140,089)	Sawtooth
Pioneer Mountains	Sawtooth (119,559)	Salmon-Challis (169,371)	Sawtooth
Railroad Ridge	Sawtooth (42,905)	Salmon-Challis (7,913)	Sawtooth
Blue Bunch	Boise (4,881)	Salmon-Challis (6,126)	Salmon-Challis
Red Mountain	Boise (110,350)	Salmon-Challis (4,895)	Boise

During processing of geographic information for the Roadless Area Conservation Rule, an estimated 37,000 acres of the Sawtooth National Recreation Area were mistakenly included in the Squaw Creek IRA, which is located completely on the Salmon-Challis National Forest. This area is not part of any inventoried roadless area and includes portions of Idaho State Highways 21 and 75 corridors, Stanley Lake, and other highly developed areas. This is an obvious cartographic error on the RACR maps and will be corrected in the future. Management of these lands is described in Management Areas 2 and 3 in Chapter III of the Sawtooth Forest Plan.

In addition to the IRAs shared with the Salmon-Challis and Nez Perce National Forests, eight IRAs straddle administrative boundaries between Ecogroup Forests. Lead Forests for these IRAs have also been determined and are displayed in Table IRA-3.

Table IRA-3. Internally Shared Inventoried Roadless Areas

Shared IRA	Lead Ecogroup Forest	Shared IRA	Lead Ecogroup Forest
Needles	Payette	Poison Creek	Boise
Caton Lake	Payette	Smoky Mountains	Sawtooth
Meadow Creek	Payette	Lime Creek	Sawtooth
Horse Heaven	Payette	Hanson Lakes	Sawtooth
Snowbank	Boise		

Unless otherwise noted, the analysis data presented in this portion of the EIS has been compiled on an administrative unit (National Forest) basis. In other words, data for shared Ecogroup IRAs is divided between the two National Forests that share the IRA and is presented separately for each National Forest in which the data characteristics occur. This approach differs from the data compiled in *Appendix C,* which presents information for each IRA compiled on an IRA basis.

Data in the analyses in this chapter will generally present only Ecogroup IRA acreages compiled by Forest and does not include data for the Salmon-Challis and Nez Perce portions of externally shared IRAs unless otherwise noted. Because management direction for the Salmon-Challis and Nez Perce portions of externally shared IRAs will not be completed until each of those Forests complete Forest Plan revision, any analyses that present data for the Salmon-Challis and Nez Perce portions of externally shared IRAs reflects current Forest Plan direction for those Forests. Entire IRAs, including Salmon-Challis and Nez Perce portions, are addressed in the wilderness evaluations presented in *Appendix C*.

Recommended Wilderness Areas

A number of roadless areas were recommended for wilderness designation in the past planning process, and they have been managed to protect their wilderness characteristics. These areas and their acreages are shown in Table IRA-4. Acreage figures for recommended wilderness areas differ from acreages listed for the same areas in the previous Forest Plans due to different area calculation techniques.

Table IRA-4. Wilderness Recommendations in the 1987-1990 Forest Plans for the Boise, Payette, and Sawtooth National Forests

Forest	IRA Name	Net Acres Recommended*
Boise	Needles	4,000
	Red Mountain	84,300
	Ten Mile/Black Warrior	77,100
	Hanson Lakes	13,500
	Boise Total	**179,000**
Payette	Secesh	115,400
	Needles	91,900
	Payette Total	**207,300**
Sawtooth	Hanson Lakes	18,500
	Boulder/White Clouds	186,100
	Pioneer Mountains	61,000
	Sawtooth Total	**265,600**

*Acres listed in this table use the current GIS methodology of acreage calculation, which varies slightly from the acres published in the 1987-1990 Forest Plans. Acreages are rounded to nearest 100 acres. Forest totals may differ slightly due to rounding.

Current Mechanical Transport within Recommended Wilderness

Management of much of the recommended wilderness within the Ecogroup has allowed the use of mechanical transport. Mechanical transport is a broad term that includes motorized recreation activities as well as some forms of non-motorized recreation activities. Motorized forms include snowmobiling, ATV use, motorcycle use, and any other form of motorized recreation activity. The major non-motorized use is mountain bicycling, but this category would also include other non-motorized mechanical transport such as game carts, hang gliders, backcountry in-line skates, and skateboards. For this analysis, the term "mechanical transport" will be used when referring to all forms of transportation that are inconsistent with Wilderness management. "Motorized" uses will refer strictly to motorized forms of mechanical transport, while "mechanized" uses will refer to non-motorized human-powered devices that transport people. Also for this analysis, a trail or area open to the use of any type of mechanical transport for any time during the year will be considered as open to that use. For example, ten miles of trail that are open to two-wheeled motorcycles during July through August would be considered the same as if there were no restrictions on the same 10 miles of trail.

Opportunities for the use of mechanical transport within recommended wilderness are complicated and vary across the Ecogroup area. In general, opportunities are more extensive for mechanized uses than for motorized uses due to impacts associated with motorized use and equipment. Both cross-country and trail opportunities can vary by type of vehicle and may range from totally open to seasonally restricted to totally closed. Much of the area recommended for wilderness designation by the current Forest Plans is available for some form of mechanical transport during at least a portion of the year. Table IRA-5 displays estimated values for the existing condition for mechanical transport uses within currently recommended wilderness areas.

Table IRA-5. Mechanical Transport Opportunities Within Current Forest Plan Recommended Wilderness Areas[1]

Mechanical Transport Use	Combined Recommended Wilderness		
	Boise NF	Payette NF	Sawtooth NF
Acres Open to **Summer** Cross-Country **Motorized** Use[2]	900	200	0
Acres Open to **Summer** Cross-Country **Mechanized** Use[3]	179,000	207,300	265,600
Acres Open to **Winter** Cross-Country **Motorized** Use[2]	177,400	92,900	221,900
Miles of **Summer** Trails Open to **Motorized** Use[2]	59	84	74
Miles of **Summer** Trails Open to **Mechanized** Use[3]	91	197	243
Miles of Groomed **Snowmobile** Trails	0	0	0
Miles of Groomed **Cross-Country Ski** Trails	0	0	0

[1] Values reflect current travel regulations and administrative boundaries on each Forest.
[2] Includes any form of motorized use during all or any part of the year. Area estimates are rounded to the nearest 100 acres.
[3] Includes any form of mechanized use during all or any part of the year. Area estimates are rounded to the nearest 100 acres.

Undeveloped Recreation Areas

Each of the past Forest Plans allocated areas to be maintained for undeveloped (Boise and Payette) or semi-primitive (Sawtooth) forms of recreation. Although these prescriptions vary slightly by Forest, development was generally limited to salvage harvest opportunities without any new road construction. For the most part, these areas were all or portions of some of the current IRAs. Total acreages for these areas are shown in Table IRA-6.

Table IRA-6. Undeveloped and Semi-Primitive Recreation Areas in Current Forest Plans

National Forest	Total Acres Managed for Undeveloped and Semi-Primitive Recreation
Boise	293,000
Payette	466,000
Sawtooth	335,000

Recommended Wilderness Evaluation

The Roadless Area Inventory and Evaluation Protocol (11/12/96, 12/11/98) guided the evaluation process for Forest Plan revision. This process had two steps: 1) inventory, and 2) evaluation.

Roadless Area inventories on each of the three Forests were reviewed and updated as part of the Forest Plan revision process. During the re-inventory process, changes were made to the roadless area boundaries based on project-level development and examining boundaries for areas that may have been missed for inclusion. Roadless area boundaries were adjusted to reflect project developments such as timber harvest units, new road construction, and utility corridors; undeveloped areas missed in previous inventories; and areas that have changed, over time, affecting their eligibility for classification as roadless and undeveloped. Roadless acreages also changed due to the use of new technology (GIS) to determine acreages of defined areas.

The number of individual IRAs also changed from what existed during the initial round of Forest Plans. In two separate cases, two Ecogroup IRAs that were previously divided only by administrative boundaries were combined into one IRA. Some IRAs were divided into two separate IRAs when road omissions were corrected. Conversely, some IRAs were combined when the low-standard roads separating them were reviewed and determined to not be improved roads maintained for travel by standard passenger-type vehicles. Three new IRAs were also identified on the Boise National Forest and added to the inventory. Three IRAs were dropped from the inventory entirely when recent development and a bisecting utility line were considered. All changes are reflected in Table IRA-7.

The updated inventory was included in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, (USDA Forest Service 2000). Further boundary refinements to a few IRAs to exclude known developments, amounting to approximately 2,800 total acres, were identified after publication of the Roadless Area Conservation Rule. This area amounts to less than 0.2 percent of the inventoried roadless area on the Sawtooth National Forest. The Forests are currently waiting for the development of national direction regarding the formal IRA boundary modification process to reflect the refinements that were made after November 2000.

Table IRA-7. Ecogroup Roadless Area Changes

National Forest	Past Forest Plan IRA Acreage Estimates	Net Change Acres (All sources)	Current Estimated IRA Acres
Boise	1,206,471	-97,973	1,108,498
Payette	944,751	-36,295	908,456
Sawtooth	1,138,715	+86,422	1,225,137

Evaluation of each IRA was based on the area's capability, suitability, availability, and manageability characteristics, and the need for additions to the National Wilderness Preservation System. The evaluation provides a framework for determining whether these areas should be recommended for wilderness or are better suited for allocation to other management emphasis. *Appendix C* has more detailed descriptions of the areas, the analysis process, and changes made.

Roadless Evaluation

As part of Forest Plan revision, a number of roadless characteristics were also evaluated. This evaluation was done for all roadless areas within the Ecogroup and is presented in *Appendix H*. This appendix differs from the *Appendix C* in that the evaluation in *Appendix H* focuses on characteristics not necessarily identified or necessary for wilderness suitability. *Appendix C* has a primary function of providing IRA information relative to determining wilderness suitability and wilderness recommendations. *Appendix H* evaluates a number of social and ecological characteristics or values that may be present in IRAs. Management activities have the ability to affect or diminish those values, and controversy surrounds the management of these areas. Considerable interest has been shown in providing some form of protection for roadless areas other than formal wilderness designation. The *Forest Service Roadless Area Conservation Final Environmental Impact Statement,* (USDA Forest Service 2000), was a reflection of that degree of interest and concern. Identification and analysis of values specific to individual IRAs are needed to provide a context for management decisions concerning individual roadless areas.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Laws, Regulations, and Policies - Through the Wilderness Act of 1964, Congress created the National Wilderness Preservation System (Wilderness System) to provide protection for lands relatively untouched by human activity. Under this Act, the Department of Agriculture is directed to recommend "primitive" areas that should be added to wilderness areas created on national forest lands. To meet these requirements, the Forest Service conducted the "Roadless Area Review and Evaluation" (RARE I) in 1972. FSH 1909.12.7.1 directs national forests to "...identify and inventory all roadless, undeveloped areas that satisfy the definition of Wilderness found in section 2 (c) of the 1964 Wilderness Act." In this effort, roadless areas within the National Forest System were identified for possible inclusion into the Wilderness System. By October 1973, the RARE I inventory resulted in the Forest Service's selection of 274 roadless and undeveloped areas for study as possible wilderness. However, further selection of these lands was enjoined pending the Forest Service's completion of an EIS pursuant to the requirements of the National Environmental Policy Act.

In June of 1977, the Forest Service began its second Roadless Area Review and Evaluation (RARE II) in which all roadless areas within the National Forest System were inventoried and categorized as either "wilderness," "further planning," or "non-wilderness." Areas marked as "wilderness" were to be recommended to Congress for inclusion into the Wilderness System, while those designated for "further planning" were to be protected until the completion of additional evaluation in the Forest planning process. Areas designated as "non-wilderness" were to be released for other land and resource uses and activities.

The Forest Service completed its EIS on RARE II in January 1979. In July 1979, the State of California brought an action challenging the Forest Service's decision on the ground that the Final EIS was deficient. The Ninth Circuit Court of Appeals upheld this challenge in October 1982. In February 1983, the Secretary of Agriculture announced that roadless areas previously studied for wilderness potential would be subject to evaluation. This required revisions of the Land and Resource Management Planning Regulations for National Forest System Lands. These regulations now require that roadless and undeveloped areas be identified, inventoried, and evaluated for wilderness designation by Congress as part of the forest plan revision process. This is reflected in 36 CFR 219.17(a) which states that "...roadless areas within the Nation Forest System shall be evaluated and considered for recommendation as potential Wilderness during the forest planning process." FSH 1909.12.7 also details the means by which the capability, availability, and need for potential wilderness areas is assessed.

As noted above, the Roadless Area Conservation Rule, governing management activities within IRAs was issued in 2001 and is still under judicial review. The final outcome of the judicial review will represent agency policy regarding management of Inventoried Roadless Areas, and all Forest Plans will need to be consistent with that direction.

Forest Plan Direction – The management prescription for recommended wilderness land use allocations (MPC 1.2) is specifically designed to provide areas where wilderness characteristics are protected. This prescription is designed to meet Forest Service Manual and Handbook requirements and contains direction to manage the recreation settings to the standards established for recommended wilderness areas. Forest Plan standards and guidelines within the prescription, as well as Forest-wide and Management Area direction, will be applied to ensure that appropriate recreation settings and opportunities are provided for a wide range of uses and activities.

General Effects

Recreation – Most forms of primitive dispersed recreation activities are compatible with maintaining wilderness characteristics and roadless character. However, when dispersed uses become highly concentrated, such as networks of heavily used motorized trails, wilderness characteristics and undeveloped character may be lost. Developed recreation sites, such as trailheads and campgrounds, represent development that is inconsistent with wilderness or roadless character. Developed recreation sites are usually excluded from IRAs.

Timber Harvest – The effects from timber harvest vary to some extent, depending on the intensity of timber removal and the method of timber removal. Regeneration harvests such as clearcuts, and associated roads and skid trails, create long-term changes to the landscape, resulting in developed settings that no longer have sufficient wilderness characteristics to qualify for consideration as recommended wilderness. Very light, widely dispersed timber harvest, such as a very light salvage harvest accomplished using helicopter yarding methods, can occur with minimal loss of undeveloped character. However, in almost all past cases, portions of IRAs that have undergone timber harvest no longer meet these criteria and were deleted from the Inventory.

Roads and Trails - Road construction and re-construction are usually associated with timber harvest, facility development, utility corridors, telecommunication sites, and mineral and energy development. Occasionally, roads are built or improved to meet recreation needs and activities. As noted above under *Roadless Inventory Criteria*, IRAs ***can*** contain low-standard roads. However, improved and maintained roads represent development that is inconsistent with either wilderness or undeveloped character and are generally excluded from IRAs.

Trails and new trail construction is usually compatible with maintaining wilderness characteristics and undeveloped character. However, as mentioned above, developing concentrated trail networks can result in the loss of wilderness characteristics and undeveloped character, especially when the trail network is comprised of motorized trails.

Disturbance Events, Prescribed Fire, and Non-Native Plants – Although all of these may have considerable effects on the resources within IRAs, their occurrences or presence do not generally affect an area's undeveloped character or wilderness characteristics.

Mineral and Energy Exploration and Development – Exploration and development activities usually result in the loss of undeveloped character and wilderness characteristics. Mine sites are usually excluded from IRAs, especially those with extensive surface disturbance.

Facilities and Structures – These include a broad array of physical developments and structures, such as administrative facilities, communications developments, and dams and diversions authorized under special use authorizations. Facilities and structures are not consistent with undeveloped character or wilderness characteristics and are usually excluded from IRAs.

Utility Developments – These developments include pipelines and overhead powerlines that often produce visible, linear structures or ground features associated with the utility lines, or permanent structures, service roads, vegetation clearing, and ground-disturbance activities. In most cases, utility developments permanently alter landscape features and are not consistent with undeveloped character or wilderness characteristics. Usually utility lines are excluded from IRAs. In rare cases of buried pipelines in areas having brush or grass cover, the visible effects of the pipeline development over time and the area may regain much of an undeveloped character.

Aquatic, Riparian, and Watershed Management –Watershed and fisheries improvement actions can include construction of structures for stream bank stabilization (rock gabions, rock riprap, etc.), slope stabilization, and fish habitat improvement. Some structural improvements may be visually evident and may detract from the natural landscape but, generally, improvement structures are small and localized, and they have a negligible effect on undeveloped character or wilderness characteristics.

Wildlife Management –Wildlife management actions may result in a broad array of physical alterations including vegetation treatments (stand, structure, and composition cuts, browse species plantings, etc.), prescribed burning, and habitat improvement structures. Some vegetation treatments and structural improvements may be visually evident and potentially may create a "developed" landscape, which would reduce IRA inventories. Generally, the physical impacts of wildlife habitat improvement structures are so small and limited that they have a negligible effect on undeveloped character or wilderness characteristics.

Domestic Livestock Grazing –Livestock grazing may be permitted within designated wilderness areas where grazing was established at the time the wilderness was designated. Livestock grazing activities are permitted in accordance with guidelines in the House of Representatives Report No. 96-1126. Corrals, fences, and water developments essential to sustain current permitted domestic livestock levels are generally allowed within designated wilderness although strong efforts are usually made to work with grazing permittees to reduce the physical and visual impacts stemming from this development. Livestock grazing itself usually has little or no effect on undeveloped character or wilderness characteristics. Minor structural range improvements, such as stock watering developments and fence lines, may still be consistent with undeveloped character and wilderness characteristics unless they create obvious, large areas of altered landscape or development. Nonstructural range improvements such as stock driveways, chained areas, and terracing, would be excluded from IRAs when readily visible and apparent.

General Effects by Management Prescription Category

Direct and indirect effects for all alternatives are based on assigned management prescriptions and their potential for development. These prescriptions are the same for all alternatives and are described below. Although acres by prescription are analyzed for the planning period (10-15 years) for purposes of comparison, it is highly doubtful that all potential development would occur during this time period. A 50- to 100-year timeframe is more reasonable in which to expect direct, indirect, and cumulative effects to occur. Similarly, it is possible that management prescriptions could change over this longer timeframe, depending on a number of biological, technological, social, and political variables. Such decisions would be made during future forest plan revision efforts.

Externally Shared IRA Management Direction – Current management direction for portions of IRAs on the Salmon-Challis and Nez Perce National Forests are carried over under all alternatives. Management direction for IRA portions on those Forests will be reviewed during their Forest Plan revisions. Accordingly, Wilderness recommendations for those portions are also carried over under all alternatives. Management direction in Alternatives 4 and 6 relating to the use of mechanical transport within recommended wilderness does not apply to these portions of adjacent Forests. Mechanical transport opportunities within recommended wilderness, as they currently exist for these areas, are the same in every alternative.

Potential Effects on Externally Shared Recommended Wilderness Areas during Forest Plan Revisions on Adjacent National Forests – Wilderness recommendations within portions of externally shared IRAs will not be complete until the Salmon-Challis and Nez Perce National Forests complete Forest Plan revisions as well. Under Alternatives 1B, 2, 3, 6, and 7, two recommended wilderness areas, Boulder-White Cloud and Pioneer Mountains straddle the Sawtooth and Salmon-Challis administrative boundary. If it were determined during the Salmon-Challis Plan revision that their portions were not to be recommended for wilderness designation, it would leave the Sawtooth portions of the Boulder-White Cloud at almost 323,000 acres and the Pioneer Mountains at almost 120,000 acres. The Sawtooth portions of these recommended wilderness areas would still be viable as recommended wilderness based on minimum size as well as criteria such as wilderness characteristics, special features, and physical configuration.

Under Alternatives 1B, 2, 3, 6, and 7, Ecogroup portions of two shared IRAs, Red Mountain and Hanson Lakes, are recommended for wilderness designation. No portions of these IRAs on the Salmon-Challis National Forest were recommended under the current Salmon-Challis Forest Plan. The Boise and Sawtooth portions of these recommended wilderness areas are fully viable without the Salmon-Challis portions of these IRAs based on minimum size criteria as well as wilderness characteristics, special features, and physical configuration. Allocation outcomes for the Salmon-Challis portions of these IRAs will be reconsidered during the Salmon-Challis Forest Plan revision process, but any allocation decision should not affect the viability of the Red Mountain and Hanson Lakes recommended wilderness areas.

Under Alternative 4, the Payette portion of the Rapid River IRA is recommended for wilderness designation while the Nez Perce portion is not. No portion of the Rapid River IRA on the Nez Perce National Forest was recommended under the current Nez Perce Forest Plan. Given that the Payette portion is almost 68,000 acres in size, it's viability as a potential recommended wilderness is not dependent on allocation decisions for the Nez Perce portion based on minimum size criteria as well as wilderness characteristics, special features, and physical configuration. Allocation outcomes for the Nez Perce portion of this IRA will be reconsidered during the Nez Perce Forest Plan revision process, but any allocation decision should not affect the viability of the Rapid River recommended wilderness area under Alternative 4.

Direct and Indirect Effects by Alternative

Analysis Details

Information presented in the following analyses has been extracted from a more extensive technical report in the interest of brevity of the EIS. Analysis methodology is not detailed in the EIS and actual figures are, in most cases, rounded. The technical report is available upon request if full details regarding methodology and exact figures are desired.

Issue 1 - IRA Development Potential

Disposition relative to the potential for development can be analyzed based on the management prescription categories (MPCs) assigned to each IRA. Potential outcomes for IRAs under assigned MPCs can be combined into four categories:

- Management prescriptions that allow a full range of development opportunities;
- Management prescriptions that have the potential for low levels of development;
- Management prescriptions that maintain undeveloped character; and
- Recommended for Wilderness designation.

The MPCs vary in the kinds of development that would be possible under each. However, it must be recognized that, under every MPC, road construction and reconstruction can occur where needed to provide access related to reserved or outstanding rights, or to respond to statute or treaty. As these conditions are common to every MPC, they are not considered in this analysis.

Full Range of Development Prescriptions – Potential development of Inventoried Roadless Areas is reflected in the management prescriptions that they are assigned under every alternative. The management prescriptions vary by alternative so potential development of each IRA can also vary by alternative. In any case, development that might be allowed under any management prescription would be likely to occur slowly over time and only after site-specific analysis and disclosure of the development's potential effects.

Individually and collectively, road building and other development activities can directly alter physical and biological characteristics of roadless areas, such as soil productivity, water quality, air quality, vegetation patterns, and habitat effectiveness. Indirectly, development activities can modify the primitive recreational character of an area through the sights and sounds of human presence. These disturbances cumulatively heighten the sensation of being in a developed area. Visitors seeking a primitive experience would choose not to visit such an area, and obvious signs of development would result in the Forest removing the area from its roadless inventory. Direct and indirect development effects would also reduce or eliminate the opportunity for Congress to consider the affected area for inclusion into the National Wilderness Preservation System.

Management prescriptions that would allow a full range of development include MPCs 2.4, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 8.0. These prescriptions would allow road construction or reconstruction within IRAs as well as other development activities, such as scheduled timber harvest, which over the long term could develop substantial portions of the IRAs. The dominant feature of this disposition category relates to the potential intensities of management activities. These prescriptions emphasize specific types and intensities of management activities, including concentrated development such as mining sites (8.0), rangeland vegetation management (6.2, 6.1) forest vegetation management (5.2, 5.1, 2.4), recreation (4.3, 4.2). Under these prescriptions, development activities are likely to be more concentrated and extensive than other prescriptions.

Low Levels of Development Prescriptions – Management prescriptions that would be likely to allow low levels of development include MPCs 3.1, 3.2, 4.1b, and 4.1c. 4.1b and 4.1c do not allow any new road construction within IRAs, and 3.1 and 3.2 would allow little or no new road construction. However, these prescriptions do allow for some resource management activities that potentially could change undeveloped areas into developed ones. Under these MPCs, IRAs could receive relatively low levels of vegetation managements such as timber salvage. Mechanical restoration treatments, such as habitat restoration, or treatments to reduce the hazard of insect hazard or uncharacteristic wildfire, are allowed under 3.2 and 4.1c. The level of development might not necessarily be sufficient to change the "roadless" status of the IRA. The difference between these MPCs and those of the full range of development prescriptions lies in the likely level of concentration and intensity in management activities.

Development under 3.1, 3.2, 4.1b, and 4.1c, although a possibility, is likely to be much lower in intensity, concentration, and occurrence than under MPCs 2.4, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 8.0.

Prescriptions That Maintain Undeveloped Character – Management prescriptions that do not allow road construction or reconstruction, outside of designated wilderness, are 2.2, 4.1a, and 2.1 Wild river corridors. Although some limited management activities may occur in these areas, no lasting signs of development would be produced. Emphasis is generally on allowing natural processes to dominate, while maintaining at least a semi-primitive recreational setting. No change to inventoried roadless areas would occur.

Recommended Wilderness – Recommended wilderness areas are represented by MPC 1.2. These areas would be protected from development activities that might disqualify them from wilderness consideration until such time that Congress decides whether or not to officially designate them as wilderness areas. Natural processes dominate, and the recreational setting is predominantly primitive, although some motorized recreation may be allowed in designated areas. No change to inventoried roadless areas would occur.

Table IRA-8 displays a breakdown of the effects of assigned management prescriptions on roadless areas by lead Forest and alternative. This table shows the approximate acreages (rounded to the nearest 1000 acres) and the percent of total areas within IRAs that result in each disposition category.

Full Range of Development Prescriptions – The levels of prescriptions presenting a full range of development within IRAs are generally lowest under Alternative 6, with no acres assigned. This reflects the theme of Alternative 6, which emphasizes roadless area protection and allows no development within the IRAs. Alternative 4 on the Payette also has no acres assigned to these prescriptions. As would be expected, Alternative 5 offers the highest level of full range of development prescriptions, ranging from 612,500 acres on the Payette to 912,500 on the Sawtooth. For the Boise National Forest, Alternatives 7 and 4 are the second and third lowest with only about 23,900 and 95,100 acres, respectively, assigned to full range of development prescriptions. The remaining alternatives range from 369,800 to 608,100 acres for the Boise. Other than Alternative 5, the level of full range of development prescriptions is relatively low on the Payette, compared to the Boise and the Sawtooth. Levels on the Payette range from 2,700 acres under Alternative 7 to 139,300 acres under Alternative 3. Although the range of values for the Sawtooth is relatively high, this is somewhat misleading. Most of the MPC assignments in this category on the Sawtooth are 6.1 and 6.2, which are largely rangelands over which development would not be as concentrated or obvious as on the forested lands on the Boise and Payette. Values on the Sawtooth range from the second lowest of 55,200 acres under Alternative 4 to the second highest of 604,900 acres under Alternative 1B.

Table IRA-8. IRA Disposition Acres and Percent of Forest IRAs by Alternative[1]

Indicator	Alternative	Boise NF IRAs		Payette NF IRAs		Sawtooth NF IRAs	
		Acres	%	Acres	%	Acres	%
Areas assigned to management prescriptions that allow a **full range of development** opportunities	1B	608,100	55%	136,900	15%	604,900	49%
	2	369,800	33%	56,100	6%	363,300	30%
	3	404,900	37%	139,300	15%	445,400	36%
	4	95,100	9%	0	0%	55,200	5%
	5	853,600	77%	612,500	67%	912,500	74%
	6	0	0%	0	0%	0	0%
	7	23,900	2%	2,700	0%	121,200	10%
Areas assigned to management prescriptions that have the potential for **low levels of development**	1B	316,400	29%	549,700	61%	352,800	29%
	2	549,800	50%	627,400	69%	596,100	49%
	3	514,700	46%	526,700	58%	513,700	42%
	4	208,400	19%	25,500	3%	240,900	20%
	5	248,800	22%	68,700	8%	310,700	25%
	6	0	0%	0	0%	0	0%
	7	868,100	78%	628,300	69%	838,200	68%
Areas assigned to management prescriptions that **maintain undeveloped character**	1B	5,100	<1%	14,500	2%	1,900	<1%
	2	5,100	<1%	17,600	2%	1,900	<1%
	3	5,100	<1%	35,100	4%	2,100	<1%
	4	68,200	6%	13,700	2%	1,800	<1%
	5	6,100	1%	227,200	25%	1,900	<1%
	6	924,600	83%	701,200	77%	961,300	78%
	7	32,600	3%	70,200	8%	1,900	<1%
Areas **recommended for wilderness** designation	1B	179,000	16%	207,300	23%	265,600	22%
	2	183,900	17%	207,300	23%	263,900	22%
	3	183,900	17%	207,300	23%	263,900	22%
	4	736,800	66%	878,900	97%	927,200	76%
	5	0	0%	0	0%	0	0%
	6	183,900	17%	207,300	23%	263,900	22%
	7	183,900	17%	207,300	23%	263,900	22%

[*]Acreages are rounded to the nearest 100 acres. Forest totals by alternative or Forest may differ slightly due to rounding.

Low Levels of Development Prescriptions – The amounts of low level of development prescriptions are the lowest on all three Forests at 0 acres under Alternative 6. Again, this reflects the theme of Alternative 6, which emphasizes roadless area protection and allows no development within the IRAs. Alternative 4 is the second lowest for all three Forests, ranging from 25,500 acres on the Payette to 240,900 acres on the Sawtooth. The highest levels are found under Alternative 7 for all three Forests, ranging from 628,300 on the Payette to 868,100 on the Boise. The remaining alternatives range from 248,800 acres to 549,800 acres on the Boise; 68,700 to 627,400 on the Payette; and 310,700 to 596,100 on the Sawtooth.

Prescriptions That Maintain Undeveloped Character - For the Boise National Forest, acres assigned to prescriptions that would maintain the undeveloped character within IRAs range from a very low of 5,100 in Alternatives 1B, 2, and 3, to a high of 924,600 in Alternative 6, which emphasizes roadless area protection. Alternative 5 is also very low at 6,100 acres. Alternative 4 has an estimated 68,200 acres and Alternative 7 has 32,600 acres of undeveloped prescriptions assigned to areas within IRAs.

For the Payette National Forest, Alternatives 1B, 2, and 4 all have very low levels of undeveloped prescriptions, with less than 20,000 acres assigned. At 13,700, Alternative 4 is not as high as might be expected under this alternative, because most of the roadless areas under it were afforded additional protection through recommended wilderness prescriptions. Alternative 3 has a somewhat higher level of 35,100 acres. Alternative 5 has a relatively high level of 227,200 acres. This is higher than what might be expected but reflects a compensation for the lack of recommended wilderness under this alterative. Alternative 6 offers the highest figure of 701,200 acres, which is expected in an alternative that is designed to protect roadless areas.

For the Sawtooth National Forest, Alternatives 1B, 2, 3, 4, 5 and 7 all have very low levels of close to 2,000 acres assigned to prescriptions that would maintain undeveloped character within IRAs. Alternative 4 also has a relatively low level of assigned acres because most of the roadless areas under this alternative were afforded additional protection through a recommended wilderness prescription. Alternative 6 offers the highest level of 961,300 acres, which is what would be expected under that alternative.

Recommended Wilderness – For the Boise, Payette, and Sawtooth National Forests, Alternative 1B recommends the same areas that were originally recommended for wilderness in the original Forest Plans. Although some of the recommended wilderness boundaries were slightly modified under Alternatives 2, 3, 6, and 7, no additional areas are recommended. As such, the levels of recommended wilderness remain roughly the same in Alternatives 1B, 2, 3, 6 and 7 for all three Forests. This level is roughly 655,000 for the Ecogroup as a whole. Alternative 5, which emphasizes commodity production, has no areas recommended for wilderness designation. This maximizes the amount of area available for potential development under Alternative 5. At the other end of the spectrum, Alternative 4, which emphasizes minimal human disturbance, recommends the highest amount of acres for recommended wilderness, totaling about 2,547,000 for the combined Forests.

IRA Dispositions for Salmon-Challis and Nez Perce portions of Ecogroup-Lead IRAs - Prescriptions for portions of Ecogroup-lead IRAs (Pioneer Mountains, Boulder-White Cloud, Railroad Ridge, Hanson Lakes, Red Mountain and Rapid River) were the same as the current Forest Plan across all alternatives. As a result their dispositions under the alternatives also remain static. Table IRA-9 displays these dispositions cumulatively by Forest. Management direction for these areas will be completed when each Forest completes Forest Plan revision.

Table IRA-9. IRA Disposition Acres for Salmon-Challis and Nez Perce portions of Ecogroup-Lead IRAs *

Forest	IRA Disposition Under All Alternatives			
	Acres assigned to MPCs that allow a **full range of development** opportunities	Acres assigned to MPCs that have the potential for **low levels of development**	Acres assigned to MPCs that **maintain undeveloped character**	Acres **recommended for wilderness** designation
Salmon Challis	0	249,000	0	87,000
Nez Perce	5,000	11,000	4,000	0

* Forest totals by alternative may not add up to actual totals due to rounding.

Issue 2 - Forest Health Treatment Capability

Uncharacteristic wildfire and insect infestation are two of the most prominent forest health problems within the Ecogroup area. To assess threats of uncharacteristic wildfire, analyses included in this Forest Plan revision process evaluated all areas within the Ecogroup relative to uncharacteristic wildfire hazard conditions. In this effort, vegetation within the Ecogroup was analyzed and assigned a rating for uncharacteristic wildfire hazard based on existing vegetation conditions. More details regarding each of these analyses and the ratings can be found in the *Vegetation Hazard* and *Fire Management* sections of this chapter. Most areas were rated as either, low, medium, high, or extreme for uncharacteristic fire hazard conditions. High or extreme ratings also represent areas that would be likely to receive a high priority for vegetation treatments to reduce the threats from wildfire. Similarly, insect hazard was also analyzed to assess the threats posed by insect infestations to forest health. This analysis is also presented in the *Vegetation Hazard* section of this chapter. High insect hazard ratings represent areas identified as high priorities for vegetation treatments to reduce the threats of insect infestations. An estimated 7 percent of the acres within Ecogroup IRAs have been identified as having high or extreme ratings for uncharacteristic wildfire hazard, while 13 percent of the IRA acreage has been identified as having high ratings for insect hazard. The estimated total acres of these areas are displayed in Table IRA-10. Vegetation patterns and conditions vary across subwatersheds. These acreage figures as well as the percentages cited above are based on overall ratings done at the subwatershed level rather than the acres of specific vegetation condition. As such, these figures are substantially larger than the actual acres of hazardous conditions within the IRAs and cannot be compared to figures of actual vegetation conditions done at a finer scale.

Table IRA-10. IRA Acres Having High or Extreme Uncharacteristic Fire Hazard or High Insect Hazard Conditions*

Indicator	Boise NF	Payette NF	Sawtooth NF	Ecogroup Totals
Estimated acres of High or Extreme Uncharacteristic Wildfire Hazard within IRAs	97,200	117,000	17,500	231,800
Percent of total acres of High or Extreme Uncharacteristic Wildfire Hazard on Forest	33%	39%	83%	38%
Estimated acres of High Insect Hazard within IRAs	139,900	136,300	155,500	431,700
Percent of total acres of High Insect Hazard on Forest	52%	43%	76%	55%

*Acreages include only Ecogroup portions of IRAs and are rounded to the nearest 100 acres. Sums of values may differ from totals slightly due to rounding.

Relative capabilities to treat fire and insect-related forest health problems within IRAs under each alternative can be analyzed based on the combination of assigned MPCs and areas within IRAs where these problems and the need for treatments are likely to exist. The relationship between MPCs and treatments and access differs slightly for insect hazard, so it is presented separately.

The opportunities for treatment presented by the MPCs can be grouped into three categories based on the types of treatments and access that each MPC allows. The three groups consist of:

- Prescriptions that would limit both the range of treatments available as well as access capabilities (MPCs 1.2, 2.1, 2.2, 3.1, 4.1a, and 4.1b);
- Prescriptions that would limit access capabilities but allow a wide range of treatments (MPCs 3.2 and 4.1c); and
- Prescriptions that would allow both a full range of treatments and access capabilities (MPCs 2.4, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 8.0).

The alternatives can be evaluated based on the total acres within IRAs having high or extreme uncharacteristic wildfire hazard ratings or high insect hazard ratings that are assigned to each of the above MPC-based categories. Estimates for these values are displayed in Tables IRA-11 and IRA-12.

As with Issue 1, the indicators are intended to show relative differences between alternatives, rather than to represent the actual acres of treatments that are expected to occur. Treatment areas would not equal MPC acres, but would be a much smaller level based on management priorities, funding opportunities, and project-level planning decisions within the planning period.

Table IRA-11. IRA Acres of MPCs Assigned to Areas Within IRAs Having High or Extreme Ratings for Uncharacteristic Wildfire Hazard by Alternative*

Forest	Forest Health Capability	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	Treatments and Access Limited	35,200	36,200	11,100	87,000	200	97,000	10,100
	Treatments Available; Access Limited	0	20,400	43,600	4,100	11,900	0	84,000
	Treatments and Access Available	62,000	40,600	42,500	6,100	85,100	200	3,200
Payette	Treatments and Access Limited	24,000	35,800	42,400	117,000	25,400	117,000	101,400
	Treatments Available; Access Limited	65,400	73,400	51,600	100	7,700	0	15,400
	Treatments and Access Available	27,600	7,800	23,000	0	84,000	0	200
Sawtooth	Treatments and Access Limited	2,300	2,400	2,600	15,100	0	17,500	3,300
	Treatments Available; Access Limited	7,200	10,100	8,000	2,500	3,700	0	13,400
	Treatments and Access Available	8,000	5,100	6,900	0	13,800	0	800

* Actual Forest figures by alternative are rounded to the nearest 100 acres. Totals by alternative may differ slightly due to rounding.

In the case of insect hazard, a slight shift in MPC categories occurs because MPC 4.1b allows salvage treatments, which might be used to reduce insect hazard conditions. This moves 4.1b from the first category and into the second to create the following MPC groupings:

- Prescriptions that would limit both the range of treatments available as well as access capabilities (MPCs 1.2, 2.1, 2.2, 3.1, and 4.1a);
- Prescriptions that would limit access capabilities but allow a wide range of treatments (MPCs 3.2, 4.1b, and 4.1c); and
- Prescriptions that would allow both a full range of treatments and access capabilities (MPCs 2.4, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 8.0).

Table IRA-12. IRA Acres of MPCs Assigned to Areas Within IRAs Having High Ratings for Insect Hazard by Alternative*

Forest	Forest Health Capabilities	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Boise	Treatments and Access Limited	59,700	61,700	18,600	127,700	400	139,600	36,800
	Treatments Available; Access Limited	0	37,600	75,900	7,500	28,400	200	97,400
	Treatments and Access Available	80,200	40,600	45,400	4,700	111,000	0	5,700
Payette	Treatments and Access Limited	100,000	100,400	44,600	134,800	28,400	136,300	110,300
	Treatments Available; Access Limited	7,500	24,900	66,900	1,400	11,500	0	25,800
	Treatments and Access Available	28,700	11,000	24,800	0	96,300	0	200
Sawtooth	Treatments and Access Limited	71,500	70,800	32,500	140,500	300	155,500	34,600
	Treatments Available; Access Limited	1,200	52,000	70,400	14,000	34,700	0	109,200
	Treatments and Access Available	82,800	32,700	52,600	1,000	120,500	0	11,700

* Actual Forest figures by alternative are rounded to the nearest 100 acres. Totals by alternative may differ slightly due to rounding.

Generally, Alternative 6 would provide the highest level of limitations on treatment types and access within IRAs for all three Forests. Alternative 4 would provide the second highest level of limitations on management activities within IRAs. This is largely because MPCs 1.2 and 4.1a, which allow little or no mechanical treatments and no road building, are the predominant management prescriptions under those alternatives. All of the other alternatives offer a substantially wider range of treatment and access opportunities.

Areas where treatments and access opportunities are both available are the greatest under Alternative 5 for all three Forests. Alternative 1B ranks second in providing management strategies with the fewest treatment and access limitations. This would be expected since commodity production and active vegetation management themes are prominent under these alternatives. Generally, Alternatives 3 and 2 provide moderate to high levels of areas where both treatments and access are available due to the emphasis on restoration activities.

Issue 3 - Roadless Area Conservation Rule Consistency

Each alternative's level of consistency with the RACR can be analyzed based on the assigned MPCs. Some MPCs (1.2, 2.1, 2.2, and 4.1a) are consistent with management direction prescribed for IRAs under the current version of the RACR. Acres and percents of IRAs assigned to these management prescriptions are compiled and displayed in Table IRA-13 along with those of inconsistent management prescriptions.

Alternative 6 is the only Alternative that is fully consistent with the RACR for all three Forests. All other alternatives are inconsistent with the RACR to some extent. Although not fully consistent, Alternative 4 is close to being consistent on the Payette and Sawtooth and is also the second closest alternative on the Boise. Alternative 5 is the least consistent on the Boise and Sawtooth, while Alternative 1B slightly edges out Alternatives 2 and 5 as the least consistent on the Payette. Values for all three Forests under Alternatives 1B, 2, 3, and 7 are relatively similar on each Forest, ranging only from about 17 percent to 31 percent of the acres being consistent with the RACR.

Table IRA-13. Roadless Area Conservation Rule Consistency*

Forest	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
IRA Acres Assigned to Management Prescriptions That Are Consistent with the RACR							
Boise	184,000	188,900	188,900	805,000	6,100	1,108,500	216,500
Payette	221,800	224,900	242,500	883,000	227,200	908,500	277,500
Sawtooth	267,500	265,800	266,000	929,000	1,900	1,225,100	265,800
IRA Acres Assigned to Management Prescriptions That Are Not Consistent with the RACR							
Boise	924,500	919,600	919,600	303,600	1,102,400	0	892,000
Payette	686,600	683,500	666,000	25,500	681,200	0	631,000
Sawtooth	957,600	959,300	959,100	296,200	1,223,200	0	959,300
% of IRA Acres Assigned to Management Prescriptions That Are Consistent with the RACR							
Boise	17%	17%	17%	73%	1%	100%	20%
Payette	24%	25%	27%	97%	25%	100%	31%
Sawtooth	22%	22%	22%	76%	<1%	100%	22%
% of IRA Acres Assigned to Management Prescriptions That Are Not Consistent with the RACR							
Boise	83%	83%	83%	27%	99%	0%	80%
Payette	76%	75%	73%	3%	75%	0%	69%
Sawtooth	78%	78%	78%	24%	>99%	0%	78%

* Actual Forest totals by alternative are rounded to the nearest 100 acres. Totals by alternative may differ slightly due to rounding.

In the above analysis, MPCs 3.1 and 4.1b were considered inconsistent with the RACR because of their allowance of salvage harvest. Salvage harvest is not a scheduled activity and may occur only infrequently. As a result, the on-the-ground results under Alternatives 1B, 2, 3, and 7 would likely be more consistent with the RACR than the above figures would indicate.

Issue 4 - Use of Mechanical Transport within Recommended Wilderness

This analysis only reflects the effects of programmatic decisions made in the Forest Plan revision process. It does not preclude or reflect potential site-specific travel management decisions that may be made in subsequent travel planning processes. Travel regulations for motorized uses can change substantially between summer and winter due to the change in types of vehicles and general accessibility. Mechanical transport opportunities are substantially greater in the winter than in the summer for all three Forests. For that reason, both summer and winter opportunities for cross-country travel are presented. Summer trail use must be distinguished from winter trail use because, in most cases, groomed winter trails are located on existing roads during winter snowpack conditions. Groomed cross-country ski trails are included in the analysis because grooming of ski trails requires the use of motorized equipment that would be prohibited under Alternatives 4 and 6. This could potentially affect cross-country ski trail-grooming capabilities at existing trail sites. Winter snowmobile trails that are simply designated but not groomed could also potentially be affected under Alternatives 4 and 6. However, they are not included in this analysis because they represent a much lower level of investment and established use.

Alternative 5 has no recommended wilderness so it would not be affected by any management direction that was applied specifically to recommended wilderness areas. In reality, the on-the-ground results under Alternative 5 would be the same as those of Alternatives 1B, 2, 3, and 7. Because Alternative 5 does not recommend any areas for wilderness designation on the Ecogroup Forests, the issue regarding protection of wilderness values and the establishment of non-conforming uses is largely moot.

Opportunities for the use of mechanical transport within recommended wilderness areas would remain as they currently are under Alternative 1B. Acres open to cross-country travels shifts somewhat under Alternatives 2, 3, and 7. However, the relatively small shifts under Alternative 1B and those under Alternatives 2, 3, and 7 result purely from slight differences in the boundaries of individual recommended wilderness areas and do not represent changed travel regulations on the ground. In reality, there would be no overall differences in opportunities between these alternatives. Motorized and mechanized use opportunities would be maintained as they currently exist. This would also mean that current, non-conforming uses would be allowed to continue and possibly contribute to their long-term establishment. As such, opportunities for solitude and primitive recreation experiences within these recommended wilderness areas would remain at less than what could potentially be offered. This effect varies slightly with the differences in recommended wilderness boundaries between Alternative 1B and Alternatives 2, 3, and 7.

Prohibiting motorized uses within recommended wilderness would also present a direct, financial impact to the Forests. Some of the trails within recommended wilderness areas were constructed or improved using grants from the Idaho Department of Parks and Recreation. Under the grant program rules, conversion to non-motorized use would require repayment to the appropriate recreational program fund account an amount determined by investment amortization through use, project life expectancy, and depreciation or appreciation. The Idaho Department of Parks and Recreation has estimated the combined repayment for all three Forests to be $1,086,000 for Alternative 4. The amount for Alternative 6 has not been estimated but it would be considerably less considering its much lower level of recommended wilderness.

In that the recommended wilderness areas vary by alternative, the current opportunities for the use of mechanical transport also vary by alternative. The acres and miles of mechanical transport opportunities for the recommended wilderness areas under each alternative, based on current travel regulations, are displayed in Table IRA-14. Recommended wilderness areas are the same under Alternatives 2, 3, 6, and 7, so the current condition is the same for recommended wilderness under each of those alternatives. The current situation for Alternative 1B differs from that of Alternatives 2, 3, 6, and 7 only because of small boundary differences.

Table IRA-14. Opportunities for Mechanical Transport Uses Within Recommended Wilderness Areas by Alternative Under Current Travel Regulations

Indicator	Alternatives[1]	Boise NF	Payette NF	Sawtooth NF
Acres Open to **Summer** Cross-Country **Motorized** Uses[2]	1B	900	200	0
	2, 3, 6, & 7	200	200	0
	4	95,200	100,500	157,700
Acres Open to **Summer** Cross-Country **Mechanized** Uses[3]	1B	179,000	207,300	265,600
	2, 3, 6, & 7	183,900	207,300	263,900
	4	736,500	883,000	927,200
Acres Open to **Winter** Cross-Country **Motorized** Uses[2]	1B	177,400	92,900	221,900
	2, 3, 6, & 7	182,300	92,900	220,200
	4	685,500	547,300	671,100
Miles of **Summer** Trail Open to **Motorized** Uses[2]	1B	59	84	74
	2, 3, 6, & 7	62	84	70
	4	358	480	479
Miles of **Summer** Trail Open to **Mechanized** Uses[3]	1B	91	197	243
	2, 3, 6, & 7	98	197	239
	4	487	847	856
Miles of Groomed **Snowmobile** Trails	1B	0	0	0
	2, 3, 6, & 7	0	0	0
	4	0	7	2
Miles of Groomed **Cross-Country Ski** Trails	1B	0	0	0
	2, 3, 6, & 7	0	0	0
	4	0	0	10

[1] There is no recommended wilderness in Alternative 5. As a result, it does not appear in the above data.
[2] Includes any form of motorized use during all or any part of the year. Area estimates are rounded to the nearest 100 acres.
[3] Includes any form of mechanized use during all or any part of the year. Area estimates are rounded to the nearest 100 acres.

Estimates for opportunities for the use of mechanical transport within recommended wilderness areas under each alternative are displayed in Table IRA-15. This table reflects the outcome of revised Forest Plan management direction for recommended wilderness under Alternatives 4 and 6. Because mechanized transport within recommended wilderness is prohibited under Alternatives 4 and 6, the results for those alternatives would be the same. The results for Alternative 1B differ from those of Alternatives 2, 3, and 7 only because of small recommended wilderness boundary differences between those alternatives.

Under Alternatives 4 and 6, the use of mechanical transport is categorically prohibited within recommended wilderness. These alternatives would reduce both motorized and mechanized recreation opportunities substantially, including all motorized and mountain bike use, across the Ecogroup recommended wilderness areas. This effect is larger in scale under Alternative 4 than 6 due to the much greater area of recommended wilderness in Alternative 4. The reduction is greater for cross-country travel in the winter than in the summer because of the substantially larger areas currently open to cross-country travel in the winter. Conversely, Alternatives 4 and 6 would discontinue non-conforming uses and would increase opportunities for solitude and primitive recreation experiences within these areas.

Approximately 200 acres currently open to cross-country summer motorized travel on both the Boise and Payette would be converted to non-motorized access under Alternative 6. With the expanded recommended wilderness areas in Alternative 4, the reduction in summer cross-country travel ranges from 95,200 acres on the Boise, to 157,700 on the Sawtooth, with 100,500 acres estimated for the Payette. Winter cross-country travel reductions would range from 92,900 to 220,200 acres under Alternative 6, and from 547,300 to 685,500 acres under Alternative 4.

Table IRA-15. Opportunities for the Use of Mechanical Transport Within Recommended Wilderness Areas Under Revised Forest Plan Direction

Indicator	Alternatives[1]	Boise NF	Payette NF	Sawtooth NF
Acres Open to **Summer** Cross-Country **Motorized** Uses[2]	1B	900	200	0
	2, 3, & 7	200	200	0
	4 & 6	0	0	0
Acres Open to **Summer** Cross-Country **Mechanized** Uses[2]	1B	179,000	207,300	265,600
	2, 3, & 7	183,900	207,300	263,900
	4 & 6	0	0	0
Acres Open to **Winter** Cross-Country **Motorized** Uses[2]	1B	177,400	92,900	221,900
	2, 3, & 7	182,300	92,900	220,200
	4 & 6	0	0	0
Miles of **Summer** Trail Open to **Motorized** Uses	1B	59	84	74
	2, 3, & 7	62	84	70
	4 & 6	0	0	0
Miles of **Summer** Trail Open to **Mechanized** Uses	1B	91	197	243
	2, 3, & 7	98	197	239
	4 & 6	0	0	0
Miles of Groomed **Snowmobile** Trails	1B	0	0	0
	2, 3, & 7	0	0	0
	4 & 6	0	0	0
Miles of Groomed **Cross-Country Ski** Trails	1B	0	0	0
	2, 3, & 7	0	0	0
	4 & 6	0	0	0

[1] There is no recommended wilderness in Alternative 5. As a result, it does not appear in the above data.
[2] Area estimates are rounded to the nearest 100 acres.

Reductions in cross-country summer mechanized travel opportunities would range from 183,900 acres on the Boise to 263,900 acres on the Sawtooth under Alternative 6. The reduction would be 207,300 acres on the Payette. With the expanded recommended wilderness in Alternative 4, the reduction in summer cross-country travel ranges from 736,500 acres on the Boise, to 927,200 on the Sawtooth. The reduction on the Payette would be 883,000 acres.

Estimated effects on both summer and winter trail opportunities only reflect the trail miles within recommended wilderness areas. Actual effects under Alternatives 4 and 6 would be the result of considerations made for each trail segment that would be affected. Actual implementation results might vary somewhat in that, in some cases, trail segments outside of the recommended wilderness areas might also be affected. In some cases, use conflicts within recommended wilderness would probably be resolved by adjustments to recommended wilderness boundaries where trails are located along the recommended wilderness peripheries, barely within recommended wilderness, or trail locations could be adjusted to just outside of recommended wilderness with no net loss of trail. The results of this analysis should then be viewed as the relative levels of change, by alternative, to motorized and mechanized opportunities.

Motorized summer trails available to recreationists within recommended wilderness would be reduced on all three Forests under Alternative 6, ranging from 62 to 84 total miles. Reductions under Alternative 4 would be even greater, ranging from 358 to 480 total miles. In that there are greater numbers of summer trails open to mechanized uses than motorized uses, the scale of reduced opportunities would be greater for mechanized uses. Under Alternative 6, reductions in miles of mechanized use trails would range from 98 to 239 miles. Reductions under Alternative 4 would be even greater, ranging from 487 to 856 total miles.

Generally, the effects on winter trail uses are substantially lower than the effects on summer trail uses. This is largely because there are very few groomed trails within recommended wilderness under any alternative. There would be reductions of 7 and 2 miles of groomed snowmobile trails on the Payette and Sawtooth respectively under Alternative 4. Reductions of groomed cross-country ski trails would be limited to 10 miles on the Sawtooth. In reality, most if not all of the impacts to cross-country ski trails would probably be resolved by adjustments to recommended wilderness boundaries because these trails are located along the recommended wilderness peripheries, barely within recommended wilderness.

Current travel regulations are continued for the Salmon-Challis portions under all alternatives. The prohibition on mechanical transport in recommended wilderness under Alternatives 4 and 6 does not apply to the Salmon-Challis portions of recommended wilderness. Under the current travel regulations, the Salmon-Challis portions of the Boulder-White Cloud and Pioneer Mountains recommended wilderness areas is open to motorized and mechanized uses only on roads and trails specially designated for those uses. Currently, this consists of about 5 miles of designated primitive road within the Wildhorse Creek drainage in the Pioneer Mountains portion.

Cumulative Effects

Cumulative effects are assessed for the Ecogroup area, and, to the extent possible, for federal lands within Idaho. Statewide data regarding development capabilities within IRAs are not available. However, statewide information regarding IRAs where management direction allows or does not allow road construction and re-construction are available. This information does not address timber harvest or other potential development but does provide some sense of potential development from road construction on a statewide basis. Table IRA-16 shows a breakdown of road development potential within Ecogroup IRAs and for other National Forests in Idaho.

Issue 1 – Potential Disposition of IRAs - Based on the MPC assignments within IRAs under each alternative, acres within the Ecogroup IRAs can be distributed among three categories:

- Acres within IRAs with management prescriptions that allow road construction and reconstruction (MPCs 2.4, 3.2, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 8.0);
- Acres within IRAs with management prescriptions that do not allow road construction and reconstruction (MPCs 2.1, 2.2, 3,1, 4.1a, 4.1b, and 4.1c); and
- Acres within IRAs recommended for Wilderness designation (MPC 1.2)

Table IRA-16. Road Development Potential Within Ecogroup and Other Idaho National Forest IRAs by Alternative*

Indicator	Alternative	Southwest Idaho Ecogroup IRAs		Other Idaho National Forests	Total for Idaho National Forest IRAs	
		Acres	%		Acres	%
Acres within IRAs with management prescriptions that allow road construction and reconstruction	1B	1,350,000	42	4,187,000	5,537,000	59
	2	1,179,000	36		5,366,000	58
	3	1,854,000	57		6,041,000	65
	4	269,000	8		4,456,000	48
	5	2,447,000	75		6,634,000	71
	6	0	0		4,187,000	44
	7	665,000	21		4,852,000	51
Acres within IRAs with management prescriptions that do not allow road construction and reconstruction	1B	1,240,000	38	1,279,000	2,519,000	27
	2	1,408,000	43		2,687,000	29
	3	733,000	23		2,012,000	22
	4	426,000	13		1,705,000	18
	5	795,000	25		2,074,000	22
	6	2,587,000	80		3,866,000	41
	7	1,922,000	59		3,201,000	34
Acres within IRAs recommended for Wilderness designation	1B	652,000	20	734,000	1,386,000	15
	2	655,000	20		1,389,000	15
	3	655,000	20		1,389,000	15
	4	2,547,000	79		3,281,000	35
	5	0	0		734,000	8
	6	655,000	20		1,389,000	15
	7	655,000	20		1,389,000	15

*All acreage estimates are rounded to the nearest 1,000 acres. Totals may differ slightly due to rounding.

MPC 3.1 technically allows road construction and reconstruction where needed to address immediate response situations where, if the action is not taken, unacceptable impacts to hydrologic, aquatic, riparian or terrestrial resources, or health and safety, would result. Given this, it is anticipated that road construction and reconstruction would be extremely rare, so 3.1 is included with those MPCs that do not allow road construction and reconstruction.

Potential Road Development – Acres within IRAs for the combined Forests that potentially allow road construction are the lowest in Alternative 6 and highest in Alternative 5, ranging from 0 to 2,447,000 acres. When combined with the totals of other Idaho National Forests, this range represents from 44 to 71 percent of all the IRAs on National Forests in Idaho. Alternative 4 would allow the second lowest level of potential road building, with 269,000 acres for the three Forests, while Alternatives 1B, 2, 3, and 7 all offer moderate levels, ranging from 665,000 to 1,854,000 acres.

Maintained as Unroaded–Alternative 6 would maintain the highest level at 2,587,000 acres of MPCs that maintain the unroaded character of IRAs. Alternative 4 maintains the least at 426,000 acres due to the strong shift in that alternative to recommended wilderness. This range between Alternatives 6 and 4 represents from 41 to 18 percent of all the IRAs on National Forests in Idaho, respectively. Alternative 3 is the second lowest at 733,000 acres. Alternatives 1B, 2, 5 and 7 all offer moderate levels, ranging from 795,000 acres in Alternative 5 to 1,922,000 acres under Alternative 7.

Recommended Wilderness – For the Ecogroup, recommended wilderness acres would be 0 in Alternative 5, 652,000 in Alternative 1B, 655,000 in Alternatives 2, 3, 6, and 7, and 2,547,000 in Alternative 4. Combined with all Idaho National Forests, Alternative 5 would yield a total 734,000 acres of recommended wilderness, representing 8 percent of all IRAs in Idaho. With contributions of a little more than 650,000 acres, Alternatives 1B, 2, 3, 6, and 7 represent about 15 percent of Idaho IRAs. Alternative 4 would contribute the highest level of a total 2,547,000 to a statewide total of 3,281,000 acres or 35 percent of Idaho IRAs.

To indicate the potential for National Forest wilderness within the State of Idaho, the Ecogroup recommended wilderness acres are combined with recommended wilderness acres from all other Idaho sources in Table IRA-17. The Ecogroup acres are expressed in a range that represents the range of alternatives in this analysis. Recommended wilderness acres were then combined with designated wilderness acres from the Ecogroup and other designated wilderness areas in Idaho.

Table IRA-17. Designated and Recommended Wilderness Within the Ecogroup and other Idaho National Forests and Federal Agencies*

Indicator	Southwest Idaho Ecogroup	Other Idaho National Forests and Federal Agencies	Total Idaho Acres
Acres of Designated Wilderness	1,050,000	2,947,000	3,997,000
Acres of Recommended Wilderness	0 – 2,547,000	1,706,000	1,706,000 – 4,253,000
Total Potential Wilderness Acres	1,050,000 – 3,597,000	4,653,000	5,703,000 – 8,250,000

* All acreages are rounded to the nearest 1,000 acres.

Another cumulative source of potential federal wilderness in Idaho is roadless land administered by the Bureau of Land Management (BLM). From this land base, the BLM has inventoried 67 Wilderness Study Areas in Idaho, comprising an estimated 1,797,000 acres. The agency has recommended that Congress designate 27 of those study areas, comprising an estimated 972,000 acres, as wilderness. The remaining 825,000 acres would be released for other uses. In addition, approximately 43,000 acres of Craters of the Moon National Monument that lie in Idaho are designated wilderness.

Assuming 100 percent of the other National Forest and BLM recommended wilderness areas were designated, these contributions bring the total cumulative amount of potential federally administered wilderness in Idaho to a range of 5,703,000 to 8,250,000 acres, depending on which Ecogroup alternative is selected for implementation. These potential wilderness levels represent a 43 to 106 percent increase over current designated federal wilderness acres in Idaho; and they represent an estimated 28 to 40 percent of the total National Forest System lands in Idaho and 11 to 15 percent of the total land area of Idaho.

Issue 2 - Forest Health Problem Treatment Capability

Aggregated treatment and access values for the entire Ecogroup are displayed in Tables IRA-18 and IRA-19.

Relationships between the alternatives and these indicators are largely the same when aggregated for the Ecogroup as a whole. Again, Alternative 6 would provide the highest level of limitations on treatment types and access within IRAs for all three Forests. Alternative 4 would provide the second highest level of limitations on management activities within IRAs. All of the other alternatives offer a substantially wider range of treatment and access opportunities.

Table IRA-18. Combined Ecogroup Acres of MPCs Assigned to Areas Within IRAs Having High or Extreme Ratings for Uncharacteristic Wildfire Hazard by Alternative*

Forest Health Capability	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Treatments and Access Limited	61,500	74,400	56,200	219,000	25,600	231,600	114,800
Treatments Available; Access Limited	72,600	103,800	103,200	6,700	23,300	0	112,800
Treatments and Access Available	97,600	53,500	72,400	6,100	182,900	200	4,200

*Actual Forest figures by alternative are rounded to the nearest 100 acres. Totals by alternative may differ slightly due to rounding.

Table IRA-19. Combined Ecogroup Acres of MPCs Assigned to Areas Within IRAs Having High Ratings for Insect Hazard by Alternative*

Forest Health Capability	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Treatments and Access Limited	231,300	232,900	95,700	403,000	29,200	431,400	181,700
Treatments Available; Access Limited	8,700	114,600	213,200	23,000	74,600	300	232,300
Treatments and Access Available	191,700	84,300	122,800	5,600	327,800	0	17,700

* Actual Forest figures by alternative are rounded to the nearest 100 acres. Totals by alternative may differ slightly due to rounding.

Areas where treatments and access opportunities are both available are the greatest under Alternative 5 for all three Forests. Alternative 1B ranks second in providing management strategies with the fewest treatment and access limitations. Generally, Alternatives 3 and 2 also provide relatively high levels of areas where both treatments and access are available. Alternative 7 provides a relatively low level of areas where both treatments and access are available, ranking second lowest for uncharacteristic wildfire hazard/resistance to control and third lowest for insect hazard.

Issue 4 - Use of Mechanical Transport

Recommended wilderness management direction under Alternatives 4 and 6 would result in differences between some of the alternatives in opportunities for the use of mechanical transport on all three Forests. Estimates for acreages of cross-country travel zones and miles of trails that would be open to both motorized and mechanized uses are displayed in Table IRA-20.

Table IRA-20. Forest-wide Opportunities for Mechanical Transport Uses Under Revised Forest Plan Direction[1]

Indicator	Alternatives	Boise NF[1]	Payette NF[1]	Sawtooth NF[1]
Acres Open to **Summer** Cross-Country Motorized Uses[2]	1B, 2, 3, 5, & 7	523,800	509,200	787,200
	4	428,600	408,700	628,900
	6	523,600	509,000	782,200
Acres Open to **Summer** Cross-Country Mechanized Uses[3]	1B, 2, 3, 5, & 7	2,200,020	1,531,600	1,893,400
	4	1,465,614	648,700	966,200
	6	2,200,020	1,324,300	1,629,500
Acres Open to **Winter** Cross-Country Motorized Uses[2]	1B, 2, 3, 5, & 7	1,851,300	1,076,500	1,526,200
	4	1,165,700	529,200	852,800
	6	1,667,400	983,600	1,305,200
Miles of **Summer** Trail Open to **Motorized** Uses[2]	1B, 2, 3, 5, & 7	881	622	1,088
	4	523	142	609
	6	819	538	1,018

Indicator	Alternatives	Boise NF[1]	Payette NF[1]	Sawtooth NF[1]
Miles of **Summer** Trail Open to **Mechanized** Uses[3]	1B, 2, 3, 5, & 7	1,090	1,108	1,762
	4	603	261	906
	6	992	911	1,523
Miles of Groomed **Snowmobile** Trails	1B, 2, 3, 5, & 7	771	237	233
	4	771	230	231
	6	771	237	233
Miles of Groomed **Cross-Country Ski** Trails	1B, 2, 3, 5, & 7	28	0	80
	4	28	0	70
	6	28	0	80

[1] Data is compiled on an administrative unit basis and does not include portions of recommended wilderness on the Salmon-Challis National Forests.
[2] Includes any form of motorized use during all or any part of the year. Area estimates are rounded to the nearest 100 acres.
[3] Includes any form of mechanized use during all or any part of the year. Area estimates are rounded to the nearest 100 acres.

Results under Alternatives 1B, 2, 3, 5, and 7 reflect the current travel regulations on all three Forests because travel regulations within recommended wilderness would not shift under these alternatives. Alternatives 4 and 6 represent shifts from the current travel regulations in that mechanical transport is prohibited within recommended wilderness areas. As a result both motorized and mechanized uses would be lower under Alternatives 4 and 6. Alternative 4 would present a greater departure from current conditions that Alternative 6 due to the far greater level of recommended wilderness under Alternative 4. When considered on a whole, Forest scale rather than a recommended wilderness area scale, these effects are somewhat offset by existing travel opportunities in areas outside of recommended wilderness areas.

The percent of each National Forest that is closed to both on- and off-trail mechanical transport uses varies by alternative. Comparing these figures for each alternative provides a sense of the overall balance that would exist between the levels of mechanized and non-mechanized experiences under each alternative. These figures are displayed in Table IRA-21. This analysis only reflects the effects of programmatic decisions made in the Forest Plan revision process. It does not preclude or reflect potential site-specific travel management decisions that may be made in subsequent travel planning processes.

Table IRA-21. Percent of National Forest System Land and Trails Closed to Mechanized Transport Uses

Indicator	Alternatives	Boise NF	Payette NF	Sawtooth NF
Percent of Forest Closed to **Summer** Cross-Country Motorized Uses[1]	1B, 2, 3, 5, & 7	76%	78%	63%
	4	81%	82%	70%
	6	76%	78%	63%

Indicator	Alternatives	Boise NF	Payette NF	Sawtooth NF
Percent of Forest Closed to **Summer** Cross-Country Mechanized Uses[2]	1B, 2, 3, 5, & 7	>1%	33%	10%
	4	33%	72%	54%
	6	>1%	42%	23%
Percent of Forest Closed to **Winter** Cross-Country Motorized Uses[1]	1B, 2, 3, 5, & 7	16%	53%	28%
	4	47%	77%	60%
	6	24%	57%	38%
Percent of **Summer** Trail Miles Closed to **Motorized** Uses[1]	1B, 2, 3, 5, & 7	20%	65%	45%
	4	52%	92%	69%
	6	25%	70%	49%
Percent of **Summer** Trail Miles Closed to **Mechanized** Uses[2]	1B, 2, 3, 5, & 7	1%	38%	11%
	4	45%	85%	54%
	6	10%	49%	23%
Percent of Current Level of Groomed **Snowmobile** Trails	1B, 2, 3, 5, & 7	100%	100%	100%
	4	100%	97%	99%
	6	100%	100%	100%
Percent of Current Level of Groomed **Cross-Country Ski** Trails	1B, 2, 3, 5, & 7	100%	N/A	100%
	4	100%	N/A	88%
	6	100%	N/A	100%

[1] Includes any form of motorized use during all or any part of the year.
[2] Includes any form of mechanized use during all or any part of the year.

Values for percentages of Forests closed to cross-country motorized use are substantially higher in the summer than the winter. This is largely due to the fact that over-snow motorized use has a much lower level of ground disturbance than summer motorized vehicles potentially have. As a result, winter motorized travel is generally less restricted.

Alternatives 1B, 2, 3, 5, and 7 would result in the lowest level of restrictions on cross-country motorized uses ranging from 63 to 78 percent of the Ecogroup Forests in the summer and 16 to 53 percent in the winter. Alternative 4 would result in the greatest restrictions ranging from 70 to 82 percent in the summer and 47 to 77 percent in the winter. Alternative 6 would result in moderate levels of restrictions ranging from 63 to 78 percent in the summer and 24 to 57 percent in the winter.

Similarly, cross-country mechanized opportunities would be the lowest under Alternative 4 for each Forest, with restricted areas ranging from 33 to 72 percent. Relatively small increases above the current level would occur under Alternative 6 on the Payette and Sawtooth, but would still be less than 1 percent on the Boise.

Alternatives 1B, 2, 3, 5, and 7 would also result in the lowest level of restrictions on motorized trail use, ranging from 20 to 65 percent of the summer trails closed to motorized use. Alternative 4 would be the most restrictive, ranging from 52 to 92 percent of each Forest's trails. Alternative 6 would again be moderately restrictive, ranging from 25 to 70 percent of each Forest's trails.

Opportunities for mechanized trail use would be the lowest under Alternative 4 for each Forest, with restricted trail levels ranging from 45 to 85 percent of the current trail systems. Relatively small increases above the current level of trail restrictions would occur under Alternative 6 on all three Forests, ranging from 10 to 49 percent of the trail systems.

There would be relatively little effect on groomed snowmobile and cross-country ski trails. This is largely due to the fact that there are very few of these trails located within recommended wilderness areas. In reality, it would be likely that there would be little or no effect on the cross-country ski trails that are within recommended wilderness areas under Alternative 4. They are located barely inside of recommended wilderness boundaries, running along their peripheries. Either minor adjustments to recommended wilderness boundaries would be made to exclude the trails or the trails would be relocated where possible. There would likely be no loss of groomed cross-country ski trails under any alternative.

Wilderness

INTRODUCTION

One designated wilderness area and portions of two others are found on the Boise, Payette, and Sawtooth National Forests. The Sawtooth Wilderness covers approximately 218,000 acres and is situated entirely on the Sawtooth National Forest. Portions of the Frank Church - River of No Return (FC-RONR) Wilderness are located on the Payette and Boise National Forests. These portions amount to approximately 768,000 acres and 64,000 acres, respectively and are administered by the Payette and Salmon-Challis National Forests. An estimated 24,000 acres of the Hells Canyon Wilderness are located on the Payette National Forest but are administered by the Wallowa-Whitman National Forest.

This section only addresses areas that have already been designated as wilderness. Potential additions to the National Wilderness Preservation System are presented and analyzed in the *Inventoried Roadless Areas* Section in this Chapter. Management within the wilderness areas is not a Forest Plan Revision topic. Management direction for these wilderness areas has been or is being determined in separate planning processes and is contained in a variety of planning documents:

- **FC-RONR Wilderness –** The Programmatic and Operational Management Plans for this area are currently being revised in a separate planning process. The 1990 FC-RONR Fire Management Plan is used to guide fire use within the area.

- **Hells Canyon Wilderness –** The Comprehensive Management Plan for the Hells Canyon National Recreation Area covers the wilderness and is currently being revised in a separate planning process.

- **Sawtooth Wilderness –** The management direction for the Management Unit Number 4A-6 (Sawtooth Wilderness) was recently revised by amendment to the existing Sawtooth Land and Resource Management Plan.

A number of wilderness-related topics are also addressed in other sections of this chapter:

- Areas recommended for wilderness designation are addressed in the *Inventoried Roadless Areas* section.

- Air quality issues related to Class 1 and 2 wilderness airsheds are addressed in the *Air Quality and Smoke Management* section.

- The effects of fire use within wilderness are considered in the *Fire Management* section.

- Noxious weed infestations, control strategies, and potential spread within wilderness areas are addressed in detail in the *Non-native Plants* section.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect wilderness resources.

Background to Issue - No significant issues related directly to wilderness resources were identified during public scoping or the DEIS public comment period. Because direction for wilderness management of the three wilderness areas is detailed in law, regulation, agency policy, and in specific management plans, management in the revision alternatives would not differ. The relative amount of activities and uses may, in some cases, vary somewhat by alternative. However, they are likely to be present to some extent in all alternatives. Significant effects to wilderness areas are not expected under any alternative nor are effects expected to differ by alternative. As a result, general potential effects common to all alternatives are listed and analyzed in this section.

Affected Area

The affected area for direct and indirect effects to wilderness resources is the wilderness areas administered by the three National Forests in the Ecogroup. The affected area for cumulative effects are all of the lands administered by the Boise, Payette, and Sawtooth National Forests.

CURRENT CONDITIONS

The Payette and Sawtooth National Forests manage all or part of two wilderness areas; Frank Church River of No Return Wilderness and Sawtooth Wilderness. A portion of the Hells Canyon Wilderness lies on the Payette National Forest and is managed by the Wallowa-Whitman National Forest. Each designated wilderness is described below. Details about the current condition and management direction can be obtained from the documents listed below.

Frank Church River of No Return Wilderness

In 1980 the U.S. Congress created the River of No Return Wilderness, which in 1984 was renamed the Frank Church-River of No Return (FC-RONR) Wilderness. This area encompasses a total of about 2,418,000 acres across six national forests. However, through a formal agreement, only four Forests administer the Wilderness. The Salmon -Challis and Payette administer the Boise portion. The Payette portion is largely administered by the Payette. However, it includes a number of areas along the Middle Fork of the Salmon River and mainstem section of the Salmon that are administered by the Salmon Challis and the Nez Perce National Forests. The FC-RONR Wilderness represents the second-largest designated wilderness area in the contiguous 48 states. The estimated acreage of this area within the Southwest Idaho Ecogroup is as follows:

Boise National Forest	64,000
Payette National Forest	768,000

Management of the area is guided by the *FC-RONR Wilderness Plan*, approved in 1984. This plan was incorporated into the forest plans for the six national forests that encompass the area (Bitterroot, Boise, Challis, Nez Perce, Payette, and Salmon National Forests). The management plan and forest plans were amended in July 1994 to include terms and conditions regarding outfitter and guide operations. The management plan is currently being revised, and the most recent proposed direction is a supplemental draft environmental impact statement (EIS) released to the public in September 1999. A final EIS and decision are expected in 2003; until such time the current management plan guides management.

The FC-RONR Wilderness is noted for its steep, rugged mountains, and deep canyons. Elevations range from 2,000 feet along the main Salmon River, to over 10,300 feet in the highest peaks. Geological formations include river breaks and canyons (some up to 5,000 feet in depth), high mountains, rugged peaks, hot springs, and glaciated basins.

Elk, mule deer, whitetail deer, bighorn sheep, mountain goats, moose, black bear, and cougar are big-game species present in the area. Fish species present include chinook salmon, sockeye salmon, western cutthroat trout, bull trout, and rainbow trout. Fishing, backpacking, mountain climbing, and whitewater rafting are major attractions. The whitewater recreation experiences on the Salmon River (Congressionally designated "recreational" and "wild") and Middle Fork Salmon (Congressionally designated "wild") are popular features. Over 17,000 people float these two rivers each year.

Unique situations exist in the FC-RONR Wilderness as allowed and recognized uses under the 1980 Central Idaho Wilderness Act. The use of motorboats (including motorized jet boats) on the Salmon River and the landing of aircraft on thirty-one operational landing strips (16 public and 15 private) within the wilderness are both allowed under the legislation. Aircraft have provided access to and recreation in the wilderness for over 60 years. Given the ruggedness of the terrain, the long-established traditional aircraft use, and immense size of the area, aircraft have been and will continue to be a primary means of access and recreation in this Wilderness.

Other important current condition information for the wilderness as outlined in the DEIS (USDA Forest Service 1998) and Supplemental DEIS (USDA Forest Service 1999) includes:

- A total of 2,446 miles of trails exist in the wilderness,
- 302 noxious weed infestations occupy approximately 1,900 acres,
- Spotted knapweed is the greatest threat to native bunchgrass communities.

A complete description of the current condition, proposed management, and environmental consequences for management of the FC-RONRW are contained in the January 1998 FC-RONR

Wilderness Programmatic and Operational Management Plans Draft EIS and September 1999 Supplemental DEIS

Hells Canyon Wilderness

In 1975 the U.S. Congress created the Hells Canyon National Recreation Area (HCNRA) and the Hells Canyon Wilderness. The Oregon Wilderness Act of 1984 added Westside Reservoir Face, McGraw Creek, and part of Lick Creek to the Wilderness. The Hells Canyon Wilderness encompasses a total of 215,906 acres in Oregon and Idaho and is spread across the Wallowa-Whitman, Payette, and Nez Perce National Forests. When Congress established the HCNRA, the boundary included portions of the Nez Perce, Payette, and Wallowa-Whitman National Forests in Regions 1, 4, and 6, respectively. The Chief of the Forest Service decided that the area would be managed as one administrative unit in Region 6 by the Forest Supervisor of the Wallowa-Whitman National Forest. The Wallowa-Whitman National Forest is responsible for establishing programmatic direction for the management of the HCNRA and administers the Payette National Forest portion of the Wilderness (24,000 acres).

The Forest Plan (USDA Forest Service1990) for the Wallowa-Whitman National Forest, as amended, provides guidance through its established goals, objectives, desired future conditions, forest-wide standards and guidelines, and specific management area direction. The Forest Plan incorporates the 1982 Hells Canyon National Recreation Area Comprehensive Plan, subsequent *Forest Plan* amendments, and terms and conditions related to consultation in accordance with the *Endangered Species Act* to provide existing management direction for the HCNRA. The Hells Canyon National Recreation Area Comprehensive Plan is currently being revised as outlined in a Supplemental Draft EIS released to the public in February 2000. A final EIS and decision are expected in 2003; until such time, the current management plan guides management.

The diverse area ranges between 1,400 and 9,300 feet in elevation separated on the Oregon/Idaho state border by the Snake River. The Idaho portion is characterized by three geologic-vegetative conditions. The upper areas are alpine and subalpine with several lakes and geologic formations of glacial origin. Vegetation is sparse and broken by large areas of rock. The middle portions contain dense forests of larch, lodgepole pine, and true firs. Lower elevations are characterized by dry, rocky, barren, steep slopes breaking into the Snake River and its major tributaries. Trees are sparse and consisting mostly of ponderosa pine and Douglas-fir.

The Oregon portion is characterized by steep breakland areas composed of extremely rugged and steep terrain, including the near-vertical rock cliffs of Hells Canyon. Trees are scattered throughout but concentrated on north slopes and stream bottoms where ponderosa pine and Douglas-fir dominate.

Wilderness use is heaviest in the Seven Devils Mountains of Idaho, with its many lakes being the main attraction. Hunting for elk, deer, and chukar is popular in both Oregon and Idaho. Oregon recreation use is concentrated on the Snake River, Mid-Bench, and Freezeout Trails.

The Snake River system continues to support important runs of chinook salmon and steelhead trout. It was once the most important production area for anadromous fish in the Columbia River system. Present runs of these fish declined from historical numbers largely as the result of construction and operation of dams. At least eighty percent of the Snake River drainage formerly used by fall chinook salmon for spawning and rearing, and greater than fifty percent of the spawning and rearing habitat used by other anadromous species, have been eliminated (USDA Forest Service 1996).

Elk, mule deer, whitetail deer, bighorn sheep, mountain goats, black bear, cougar, blue and ruffed grouse, spruce grouse, golden and bald eagles are present in the area. Bald eagles are present and are a threatened species in Oregon and Idaho. Fishing, backpacking, mountain climbing, and whitewater rafting are major attractions.

A complete description of the current condition, proposed management, and environmental consequences for management of the Hells Canyon National Recreation Area is contained in the February 2000 Supplemental DEIS Hells Canyon National Recreation Area Comprehensive Management Plan.

Sawtooth Wilderness

In 1972 the U.S. Congress created the Sawtooth Wilderness, which encompasses about 218,000 acres across the Sawtooth and Boise National Forests. Management of the area is guided by the Amendment to the Sawtooth National Forest Land and Resource Management Plan—Sawtooth Wilderness Management Direction, approved in September 1997.

The wilderness is comprised of hundreds of jagged peaks, 40 over 10,000 feet in height, with nearly 400 high alpine lakes dotting the predominantly rocky terrain. Elevation ranges from 5,000 feet to just under 11,000 feet. Hidden within its boundaries are deep, secluded, tree-covered valleys. This area serves as the headwaters of four major rivers including the Salmon River. The wilderness is characterized by granitic glaciated lands, moraine lands, and high, steep ridges and peaks.

The Sawtooth Wilderness, primarily because of its proximity to expanding population bases (Salt Lake City, Boise, Ketchum-Sun Valley, Twin Falls) the promotion of its spectacular scenery, and its easy accessibility, has seen an increase in visitation of 60 percent in the past 20 years. About 90 percent of use occurs between July 1 and September 15.

There are 40 system trails totaling 247 miles within the wilderness boundary, the majority of which were constructed or reconstructed in the 1960s. The wilderness is accessed by 23 trailheads. Of an estimated 34,000 annual visitors, more than 50 percent enter from only four trailheads. Eighty percent of visitors surveyed (Boyd 1995) responded that they participated in hiking on trails, backpacking, and seeking solitude.

Vegetation ranges from sagebrush to whitebark pine, and there are no known threatened or endangered plant species in the wilderness.

Elk, mule deer, mountain goats, moose, black bear, and cougar are present in the area. The area provides habitat for threatened and endangered species including the gray wolf, Canada lynx, and peregrine falcon. This area also provides high water quality for important fisheries downstream, including endangered sockeye salmon, and threatened chinook salmon, steelhead trout, and bull trout. Many high alpine lakes also provide important recreational fisheries of introduced species such as westslope cutthroat trout, eastern brook trout, golden trout, rainbow trout, and grayling.

A complete description of the current condition, environmental consequences of alternative management strategies, and current management direction for the Sawtooth Wilderness are contained in the 1997 Amendment to The Sawtooth National Forest Land and Resource Management Plan, Sawtooth Wilderness Management Direction, Environmental Assessment.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Methods

Human use of designated wilderness is governed largely by the terms of the Wilderness Act. This serves to limit management activities within wilderness to a large extent relative to non-wilderness areas. Wilderness areas within the Ecogroup are managed and regulated in an effort to limit human impacts and influences to desired limits. Project proposals within these areas are evaluated for compliance with wilderness values. Commercial uses of wilderness are controlled by special use permits and the operations plans that are required under the special use permits.

Direct and Indirect Effects

Because direction for wilderness management of the three wilderness areas is detailed in law, regulation, agency policy, and in specific management plans, management in the revision alternatives would not differ. The relative amount of activities and uses may, in some cases, vary somewhat by alternative. However, they are likely to be present to some extent in all alternatives. Significant effects to wilderness areas are not expected under any alternative nor are effects expected to differ by alternative. As a result, general potential effects common to all alternatives are listed and analyzed in this section.

Disturbance Events – Wilderness resources are managed to promote natural, ecological processes. As such, management intent in wilderness areas is to allow disturbance events (for example, fire, insects, and disease) to play a role within wilderness areas under prescribed circumstances. Exceptions to this general direction can occur when these disturbance events threaten resources and properties within or outside the wilderness boundaries.

The objective of wilderness management is to manage physical and biological components to allow natural processes to perpetuate the included ecosystems. One of the primary ecological processes is disturbance by fire. Present conditions vary depending upon the amount of fire use and location. Fires have been actively suppressed in some areas, and this exclusion has produced vegetative conditions that are outside of the historical range of variability. It is possible that the most serious adverse impact to wilderness resources has been the suppression of fire.

Two vegetation management tools available inside wilderness areas are wildland fire use for resource benefits and prescribed fire. These fires can be used to achieve desired conditions when conducted under prescriptive criteria defined in Fire Management Plans. In some areas, prescribed fire could be used to reduce risks of damage to private property and important cultural resources from undesirable fires while also contributing to the restoration of ecological processes. Fire use could also contribute to moving toward or maintaining desired vegetative conditions.

Potential direct effects of wildland fire and prescribed fire could include a temporary loss of vegetation, reduction in water quality due to sedimentation, reduced soil productivity, loss of cultural resources, loss of grazing opportunities, air pollution, and a perceived loss in scenic quality. Wilderness users could expect temporary access restrictions during periods of fire use activities.

Indirect effects of fire use may include a temporary loss of wildlife habitat for some species, or additional habitat for others. Recreational use of burned-over areas may drop for a period of years until vegetative recovery achieves a more advanced stage. Lethal fire in heavy timber stands would also increase long-term trail maintenance needs from continued downfall of snags across trails.

Timber Management – Timber harvest is not permitted within wilderness areas. Logging activities near wilderness boundaries have the potential to create short-term noise level increases that change the user's perception of being in a remote area. Reduced vegetative cover and skid trails may also increase access into adjacent wilderness areas. Improved access may result in increased recreation use.

Roads - Construction, reconstruction, and decommissioning roads near wilderness boundaries can potentially affect wilderness resources in that they may have affects on wilderness accessibility. Road-building activities near wilderness boundaries have the potential, in some types of terrain and vegetative cover, to increase inappropriate wilderness use by creating motorized entry points. In the short term, increased noise levels change the user's perception of being in a remote area. Improved access may result in increased recreation use, while reducing access in adjacent areas, through road decommissioning, may result in reduced recreation use.

Recreation – Additional recreation use of wilderness areas is expected to increase under all alternatives along with non-wilderness areas. Corresponding increases in recreation-associated impacts to Wilderness resources can also be expected. Wilderness education will be emphasized in an effort to protect wilderness values, including signing at trailheads, public programs and brochures, and personal contacts by wilderness personnel. Full implementation budget levels are needed to implement these programs and achieve a satisfactory level of success. More intensive management of recreation use is likely to occur, which may result in the loss of some types of opportunities. In some cases, additional regulation and regulation enforcement will be needed to protect wilderness values.

Range Management – Where it currently exists, livestock grazing would continue in wilderness areas in accordance with Congressional guidelines. Because grazing is permitted within wilderness by the Wilderness Act, vacant allotments are recommended for closure based on range capability, not on wilderness considerations.

Mineral and Energy Exploration and Development – Designated wilderness is withdrawn from energy leasing and mineral entry, subject to existing rights. No leasing or oil or gas exploration and drilling activity is expected under any alternative. Mining activities can result in both short-term and long-term effects from associated structures, roads, vegetation clearing, and general ground-disturbing activities. The values for which an area is classified as wilderness could be greatly affected or lost. Effects would include disruption of natural ecological processes, alteration of the primitive setting, elimination of opportunities for solitude, introduction of disruptive noises and sights, and reduction of economic benefits from the area's value as wilderness. The effects on wilderness resources would vary depending largely on the scale and location of development. Small-scale developments of a few acres, or underground mining, would have very limited impacts, while large-scale surface mining operations would typically have major effects on correspondingly larger portions of the wilderness. Reclamation to pre-activity conditions may not be possible in some locations, creating a potential for permanent alteration of the physical setting. In that the level of mineral exploration and development is largely driven by market forces and regulated by existing mining law, there would be little difference between the alternatives in effects on the wilderness areas.

Landownership Adjustments – Generally, landownership adjustments within designated wilderness are made in order to acquire private inholdings. These are usually done to protect or maintain wilderness values from the threat of development resulting in long-term benefits for wilderness resources. In that landownership adjustments are generally a function of opportunities that are not related to Forest Plan management direction, there would be little difference between the alternatives in effects on the wilderness areas.

Cumulative Effects

Despite the effects of fire exclusion in some locations, generally, wilderness areas are in much better ecological condition than non-wilderness areas. As large tracts of relatively undisturbed land, they contribute to maintaining biological diversity while maintaining habitat connectivity. This is especially true with an area the size of the FC-RONR Wilderness. These wilderness areas have played a role in maintaining strongholds of a number of threatened, endangered, and sensitive aquatic species such as chinook salmon, steelhead trout, and bull trout. This role is likely to only increase in importance as recovery efforts for these fish species are implemented.

No Forest Plan alternative would change the amount of existing wilderness that occurs within the Ecogroup, the State of Idaho, or the National Wilderness Preservation System. Currently, the

Ecogroup Forests contribute almost 36 percent of designated wilderness within Idaho, and less than 1 percent of National Wilderness.

Wild and Scenic Rivers

INTRODUCTION

On October 2, 1968, Congress enacted the Wild and Scenic Rivers Act (Public Law 90-542; 16 U.S.C 1271-1287) to address the need for a national system of rivers. As an outgrowth of a national conservation agenda in the 1950s and 1960s, the Wild and Scenic Rivers Act (Act) was in response to the dams, diversions, and water resource development projects that occurred on America's rivers between the 1930s and 1960s. The Act concluded that selected rivers should be preserved in a free-flowing condition and be protected for the benefit and enjoyment of present and future generations. Since 1968, the Act has been amended many times, primarily to designate additional rivers and authorize the study of other rivers for possible inclusion.

There are several steps in the process of designating a river or river segment a Wild and Scenic River. First, to be eligible for inclusion into the National System, a river or river segment must be free-flowing and possess at least one outstandingly remarkable value in any of the following resource categories: scenery, recreation, geology, hydrology, fish, wildlife, botany, ecology, history, and culture. Once determined eligible, river segments and their corridors (collectively the river area) are tentatively classified for suitability study as Wild, Scenic, or Recreational based on the degree of access and amount of development along the river corridor.

The suitability study is an assessment to determine whether eligible river segments should be recommended for inclusion in the National System. In this process, river values and their potential for designation are analyzed to determine the best use of the river corridor, and if the river values are to be protected, the best method of protection. The results of the suitability study are usually submitted to the agency head for review and subsequent transmittal to Congress. The Forest Service only makes a preliminary administrative recommendation. This recommendation will receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress has reserved any final decisions to designate rivers to the National Wild and Scenic River System. Further information regarding suitability studies can be found in Appendix J to this EIS.

As of September 2002, 160 river segments comprising 11,292 miles have been designated as National Wild and Scenic Rivers. Of those, four rivers totaling an estimated 48 miles are within the Southwest Idaho Ecogroup area. These nationally recognized rivers comprise some of the nation's greatest diversity of recreational, natural, and cultural resources, offering both scientific study value and scenic beauty.

During Forest Plan revision, the Forest Service evaluated rivers on Boise, Payette, and Sawtooth National Forest System Lands to determine if additional rivers were eligible for inclusion in the National Wild and Scenic River System. In addition, five currently eligible segments were evaluated as to their suitability for designation. This analysis describes those river segments and the general effects their status could eventually have on the river corridors and Forest resources.

Issues and Indicators

Issue Statement – Eligible rivers and their corridors may affect the Forest's ability to implement management activities.

Background to the Issue – In the original forest planning process, a number of river segments (35 on the Boise, 14 on the Payette, and 4 on the Sawtooth) were identified as being eligible for Wild and Scenic River designation. Since the original Forest Plans were written, changes have occurred that made the Forests re-examine their eligibility process and results. The *Preliminary Analysis of the Management Situation Summary* (USDA Forest Service 1997) identified a need to conduct a new Wild and Scenic River eligibility study, in order to incorporate changed conditions and new information since the original plans were written. These changes included the listing of new species, changed watershed conditions, and new information from the ICBEMP Scientific Assessment (Quigley et al. 1996). Forest personnel recognized that these changed conditions could influence whether a previously ineligible stream might now be considered eligible, and vice versa. There was also a need for the three Forests to use an updated and consistent protocol for determining eligibility.

Once river segments are determined eligible or suitable, they are managed to protect their free-flowing status and any identified outstandingly remarkable values. In some instances, this change in management could restrict management activities in or adjacent to the river corridors. The amount of restriction can vary by whether the river segment is classified as Wild, Scenic, or Recreational. The main activities that could be affected are vegetation management, rangeland management, recreation development, hydroelectric development, mining, and road construction.

This analysis displays the rivers, their segments, and river corridor areas that have been determined to be eligible and their classifications. The analysis also describes the effects those classifications have on the river segments and other Forest resources.

Indicators - The primary indicator used to display effects by alternative is the amount of eligible river segments by classification that could affect, or be affected by, management activities. These segments are measured in both miles of river and acres of river corridor. Effects to and from management activities are also described in general terms.

Affected Area

The affected areas for direct and indirect effects are the eligible river corridors within lands administered by the three National Forests. Corridor boundaries are established to protect the free-flowing nature, water quality, and outstandingly remarkable values for which the river is considered eligible. Generally, the corridor width for designated, suitable, or eligible rivers cannot exceed an average of 320 acres per mile, which, if applied uniformly along the entire river segment, is one-quarter mile on each side of the river from the high water mark. Boundaries may be wider or narrower, but are not to exceed the 320-acre average per mile without approval by Congress. For analysis purposes, the affected river corridors are 0.25 mile from the high water mark on both sides of the river.

For cumulative effects, the affected areas are the eligible river corridors within the three National Forests. In addition, the analysis looks at the contributions of the alternatives to the National Wild and Scenic River System.

CURRENT CONDITIONS

Chronology of Events That Have Influenced Current Conditions

In 1982, the Boise National Forest initiated a Wild and Scenic River eligibility study, resulting in 16 rivers with a combined 35 segments determined as eligible for inclusion into the National System. The Boise National Forest has an agreement with the Sawtooth National Forest that the Boise will be the lead Forest in the suitability study for the South Fork Payette River.

In 1984, the Sawtooth National Forest initiated a Wild and Scenic River eligibility study, resulting in three rivers with a combined four segments determined as eligible for inclusion into the National System. The Sawtooth National Forest has a Memorandum of Understanding with the Bureau of Land Management, in which the BLM has the lead responsibility in completing the suitability studies for the Salmon River and the East Fork Salmon River. The Sawtooth National Forest has an agreement with the Boise National Forest that the Boise will be the lead Forest in the suitability study for the South Fork Payette River. Suitability studies have not been initiated.

Around 1987, the Payette National Forest initiated a Wild and Scenic River eligibility study, resulting in five rivers with a combined 14 segments determined as eligible for inclusion into the National System. The potential classification was not determined at this time. A letter from Forest Supervisor, Veto LaSalle, dated April 16, 1992, stated that the Payette National Forest would manage each river segment under a wild potential classification until such time the Forest Plan was amended to include the potential classification for each segment.

In 1997, another eligibility study was initiated for the Boise, Payette, and Sawtooth National Forests. This study was based on new information and changed conditions since the last eligibility studies were completed. The Forests received comments on the “potentially” eligible rivers presented in the Draft Land and Resource Management Plan during the public comment period following the release of the documents. Comments urged the Forest to reconsider the Regions of Comparison as they appeared to be too narrow in scope or applied inconsistently. Comments also supported the eligibility of the draft list or suggested that none of the rivers were eligible and the study should be discontinued.

To address these comments a three Forest interdisciplinary team re-evaluated the Regions of Comparison and the ORV criteria to ensure they were national in scope, as mandated by the Wild and Scenic Rivers Act, and to determine that the criteria had been applied consistently by resource specialists throughout the Ecogroup. During this re-evaluation some changes were made to the Regions of Comparison and Outstandingly Remarkable Values (ORVs) criteria. This re-evaluation also determined that the criteria used to assess ORVs presented in the Draft Plans and Draft EIS had been inconsistently applied.

In early 1999, a suitability study was initiated for the South Fork Salmon River on the Payette and Boise National Forests, and the Secesh River, Big Creek, Monumental Creek, and French Creek on the Payette National Forest. No other suitability studies have been initiated as of yet. The results of the suitability study for these rivers are contained in Appendix J to this EIS.

Current Conditions

Designated River Segments

Three rivers that are partially on the Payette Forest, and one river that is partially on the Payette and Boise Forests are currently designated Wild and Scenic Rivers. Together they total 48 miles. These rivers are:

- Middle Fork Salmon River - designated through public law 90-542 on October 2, 1968;
- Rapid River - designated through Public Law 94-199 on December 31, 1975;
- Snake River - designated through Public Law 94-199 on December 31, 1975; and
- Salmon River - designated through Public Law 96-312 on July 23, 1980

Neither the Boise nor the Payette National Forest is the lead Forest for managing these four rivers. No rivers on the Sawtooth Forest are currently designated as Wild and Scenic.

Eligible Rivers in the Original Land and Resource Management Plans

The following eligible rivers were analyzed in the Wild and Scenic Rivers Suitability Study Report for the Payette and Boise National Forests. Refer to Appenidx J to this EIS for the complete report.

Secesh River – The headwaters originate in Lake Creek at Marshall Lake to where it joins with Summit Creek. It then flows from the confluence of Lake and Summit Creek to the confluence with the South Fork Salmon River. The river flows through scenic meadows and deeply dissected canyons. The river is prime anadromous fish habitat. The length of river potentially suitable for Wild and Scenic River designation is 45 miles, with a river area of 12,806 acres.

South Fork Salmon River – The headwaters originate in the Boise National Forest several miles above Vulcan Hot Springs and flow to the confluence with Goat Creek on the Payette National Forest. From Goat Creek the river flows to the confluence with Smith Creek, then eventually into the main Salmon River. The South Fork Salmon River is recommended because of its beautiful scenery, numerous cultural resource sites, geology, and anadromous fisheries. The last 13 miles of the river are within the Frank Church – River of No Return Wilderness. The length of the river potentially suitable for Wild and Scenic River designation is 93 miles, with a river area of 26,900 acres.

Big Creek – From its headwaters, Big Creek rapidly flows into the Frank Church – River of No Return Wilderness as Smith Creek. From there it flows to the confluence with the Middle Fork of the Salmon River. The headwaters are located in a large scenic glacial basin and the river then flows through a glacial canyon. Big Creek is being recommended for its outstandingly anadromous fish habitat and cultural resources. The length of river potentially suitable for Wild and Scenic River designation is 49 miles, with a river area of 15,303 acres.

Monumental Creek – Monumental Creek begins at the headwaters of Coon Creek and flows to the confluence with Big Creek. The headwaters flow through large glacial basins surrounded by highly scenic ridges and mountain peaks. The creek is being recommended because of the scenery, cultural resources, geology, and anadromous fish habitat. Most of the creek is within the Frank Church – River of No Return Wilderness. The length of river potentially suitable for Wild and Scenic River designation is 26 miles, with a river area of 8,906 acres.

French Creek – Three tributary segments are included in the French Creek System. They include the entire length of French Creek from its headwaters to the confluence with the Salmon River, the headwaters of Little French Creek to the confluence with French Creek, and the headwaters of Jackson Creek to the confluence with French Creek. French Creek and its tributaries are being recommended for their geology, scenic quality, and anadromous fish habitat. The length potentially suitable for Wild and Scenic River designation is 34 miles, with a river area of 10,629 acres.

Eligible Rivers in the Revised Land and Resource Management Plans Eligibility Study

For the Draft Forest Plans and EIS, all rivers found at the 1:100,000 mapping scale were evaluated for potential eligibility. The initial review evaluated 889 rivers on the Boise Forest, 704 rivers on the Payette Forest, and 601 rivers on the Sawtooth Forest. All rivers were screened for free-flowing character and outstandingly remarkable values for resources listed above.

The Forest Ranger Districts reviewed the rivers to determine their "potential" for outstandingly remarkable values. On the Boise Forest, 45 streams were identified as having outstanding remarkable values. On the Payette Forest, 37 streams were identified as having outstandingly remarkable values. On the Sawtooth Forest, 94 streams were identified as having outstandingly remarkable values. For the Ecogroup, 176 streams were presented in the Draft Plans and EIS for public review as potentially eligible for Wild and Scenic River designation.

It is important to emphasize that the 176 rivers presented in the Draft Plans and Draft EIS were considered **potentially** eligible. The reasons they were only considered potentially eligible were: 1) the list of rivers presented in the Draft had not undergone public comment, 2) the Ecogroup may have applied the criteria to determine outstandingly remarkable values inconsistently, and 3) the Regions of Comparison used were possibly too narrow in scope.

For the eligible rivers in the Final EIS and Plans, suitability studies will be considered when:

- Strong local interest or support is demonstrated for Wild and Scenic designation; or
- A proposed project would alter the free-flowing character of a stream, or would affect the outstandingly remarkable values and/or classifications that made the stream eligible; or
- Concurrent analysis, such as watershed assessments, make it feasible to conduct suitability studies; and
- Budget realities make it possible to perform these detailed studies.

ENVIRONMENTAL CONSEQUENCES

Effects Common To All Alternatives

Resource Protection Methods

Laws, Regulations, and Policies - The Wild and Scenic Rivers Act (1968) establishes objectives, goals, and procedures for designation of Wild, Scenic, and Recreational rivers, making it national policy to "preserve selected rivers or sections thereof in their free-flowing condition, to protect water quality of such rivers and to fulfill other vital national conservation measure." Additionally, the Act provides protection of the outstandingly remarkable values, free-flowing character, and potential classification of designated river areas. According to the Act, these rivers "shall be preserved in free-flowing condition" and "they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

Forest Service Handbook 1909.12 directs the Forest Service to evaluate rivers for inclusion in the National Wild and Scenic River System during the forest planning process. Chapter 8 identifies standards for interim management of eligible and designated rivers. These standards are summarized in Table WSR-1, below.

Table WSR-1. Wild and Scenic River Direction from FSH 1909.12

Management Activity	Wild Classification	Scenic Classification	Recreational Classification
Timber Harvest	Cutting of trees is not permitted within one-quarter mile of the river except when needed in association with a primitive recreation experience, or to minimize risks to users, or to protect the environment. Timber within the visual corridor is managed to provide emphasis on visual quality.	Silvicultural practices may be allowed, provided that there is no substantial adverse impact on the river and its immediate environment. Timber within the visual corridor is managed to provide emphasis on visual quality.	Timber harvesting is permitted; the immediate river environment will be protected. Timber within the visual corridor is managed to provide emphasis on visual quality.
Mining	New mineral leases are prohibited within one-quarter mile of the river once it is officially designated. Mineral activity must minimize surface disturbance, sedimentation, pollution, and visual impairment.	New mining claims, new mineral leases, and existing claims must minimize surface disturbance, sedimentation, pollution, and visual impairment that would affect suitability for designation.	New mining claims, new mineral leases, and existing claims must minimize surface disturbance, sedimentation, pollution, and visual impairment that would affect suitability for designation.
Road Construction	No roads or other provisions for overland motorized travel are permitted within a narrow, incised river valley or, if the valley is broad, within 0.25 mile of the riverbank.	Roads may occasionally bridge the river area and short stretches of screened roads may be permitted.	Paralleling roads may be constructed along the river; there may be several bridge crossings and numerous river access points.
Livestock Grazing and	Existing domestic livestock grazing can continue,	Domestic livestock grazing is permitted to the extent	Land may be managed for a full range of agricultural

Management Activity	Wild Classification	Scenic Classification	Recreational Classification
Agriculture	consistent with riparian management standards and other grazing standards contained in the Forest Plans.	currently occurring.	uses, to the extent currently practiced.
Recreation Development	Simple comfort/convenience facilities, such as fireplaces or shelters, may be permitted if they harmonize with the surroundings.	Public use facilities are permitted within the river corridor if screened from the river.	Campgrounds, picnic areas, and other recreational developments may be established near rivers.
Motorized Travel	Motorized travel on land or water is generally not compatible.	Motorized travel on land or water may be permitted, restricted, or prohibited to protect river values.	Motorized travel on land or water may be permitted at existing levels, restricted, or prohibited to protect river values.

Forest Plan Direction – Forest-wide direction has been added to the revised Forest Plans to address interim and long-term management of eligible, suitable, and designated Wild and Scenic Rivers. This direction applies to all alternatives because it represents and refers to direction in the Wild and Scenic Rivers Act and Forest Service Handbook 1909.12. Any Forest projects or activities proposed in an eligible, suitable, or designated Wild and Scenic River corridor would be implemented under this direction. In addition, specific Wild and Scenic River segments are identified in the Management Area descriptions and direction (see Chapter III, Forest Plans).

General Effects from River Classification on Management Activities

The types and amounts of activities and changes acceptable within an eligible, suitable, or designated river corridor depend on whether it is classified as Wild, Scenic, or Recreational. Activity compatibility with classification is described in Table WSR-1 and summarized below.

A **Wild** river classification results in the river corridor being withdrawn from any new mineral development once it is officially designated and made "administratively unavailable" for new oil and gas leases. Existing valid mining claims and oil and gas leases would be allowed with restrictions that protect river values. Timber harvest is generally unacceptable, and outputs of timber from tentatively suitable timberlands that might have occurred are essentially foregone. Construction of major recreation facilities, roads, power lines, and other features is not allowed. The potential for hydroelectric power generation is also foregone. Designation would not affect the rights of landowners within a Wild river area unless local governments enacted zoning or other regulatory changes. Designation, particularly where tributary streams or important visual features lie outside the corridor, could affect the management of lands adjacent to a Wild river by requiring more constraints on water quality and visual effects of projects. Fire use within the ¼ mile corridor may be prohibited or restricted, depending on its effects to visual quality. Motorized travel is generally restricted. The Wild and Scenic Rivers Act also requires that upstream water projects may not significantly degrade the river values within the designated segments, and that downstream impoundments may not back water up into the segments.

A **Scenic** river classification places significant constraints on the management of timber in the river corridor, although small sales generally out of view of the river or recreation sites could occur. The area is not withdrawn from mineral entry, but costs of mining could increase as a result of standards for visual quality. The potential for hydroelectric power generation is foregone. Construction of major recreation facilities would not occur, but small campgrounds and boat launch facilities could be compatible. Roads, while allowed, could be more expensive as design must minimize visual impacts. Effects on management of adjacent lands would be less than for a Wild river, although activities affecting sensitive visual features may be constrained, resulting in increased cost or reduced output. Fire use could be curtailed depending on effects to visuals. Motorized travel may be allowed but can be restricted to protect river values.

A **Recreational** river classification places fewer constraints on management and development activities, although the potential for new diversions and hydroelectric power generation is still foregone. Timber may be harvested, although visual constraints can increase the cost of logging or reduce outputs slightly. Mining can occur, but would be subject to visual and other resource constraints. Road and campground construction are allowed, as is livestock grazing and other forms of agriculture. Fire use is allowed but should be compatible with recreational uses in the area. Motorized travel is generally allowed but can be restricted to protect river values.

General Effects from River Eligibility on Management Activities

In general, management activities must be designed to promote or maintain the free-flowing status and outstandingly remarkable values of eligible, suitable, or designated Wild and Scenic Rivers. Should river segments not be considered eligible or suitable for Wild and Scenic River designation, they would not receive the interim management direction associated with that status. Portions of the river corridors would still receive protection under management direction around riparian areas (RCAs/RHCAs), and the remaining area would be under the general management direction for whatever Management Prescription Category (MPC) is assigned to the surrounding area. Depending on that MPC, subsequent management could affect ineligible or unsuitable segments and their potential for future eligibility or classification. These effects are described briefly for those resource programs that could have the most influence on river values.

Effects to Special Uses - New impoundments or diversions would generally not be allowed as they would disqualify a river from eligibility for Wild and Scenic River designation. Rivers must be free flowing.

Effects to Minerals Management - Mineral or energy exploration and subsequent development are generally allowed but may be limited depending on river classification (see Table WSR-1). Exploration or development could affect scenery, water quality, and habitat by excavation, drilling, tailings, and the construction of buildings and access roads. These changes could have short- and long-term effects on reducing potential eligibility.

Effects to Domestic Livestock Grazing - Livestock use is allowed and would generally not affect a river's eligibility or classification, but could have minor short- and long-term effects on vegetation, scenic, and recreational values within the river corridor.

Effects to Vegetation Management – Allowance of timber harvest activities varies greatly by classification (see Table SWR-1). Activities could reduce the potential for future eligibility and potential classification by negatively affecting vegetation screening, scenery, and recreational values, and by constructing access roads. Harvest could also be used to improve scenery and recreational values over time, which could benefit eligibility potential over the long term.

Effects to Recreation Management – Recreation management emphasis and potential development vary greatly by classification (see Table WSR-1). Recreation developments, facilities, and use patterns would not necessarily reduce the potential for future eligibility, but they could affect the potential classification of a river segment.

Effects to Scenery Management - The effects to scenery management would depend on the visual quality objectives that are assigned to the corridor, and how much visual change to the scenery they allow. Preservation and Retention objectives emphasize maintaining a natural-appearing landscape, which would benefit the corridor and its potential eligibility. Modification objectives that allow more evident signs of development could have a short- and long-term reduction in the potential for eligibility.

Effects to Fire Management – The effects to fire management would depend on the river's classification and outstandingly remarkable values (ORVs). Fire activities may not negatively affect the river's classification and ORVs. In many instances, fire management activities may be desired to preserve or enhance the river's ORVs and classification. Fire use would also affect scenery, vegetation, and recreational values in the short term, but would not likely reduce the potential for future eligibility of any river over the long term, or change the classification.

Effects to Motorized Travel – In river corridors with a wild classification, motorized travel on land or water is generally not compatible. In corridors with a scenic classification, motorized travel on land or water may be permitted, restricted, or prohibited to protect river values. In river areas and corridors with a recreational classification, motorized travel on land or water may be permitted at existing levels, restricted, or prohibited to protect river values.

Direct and Indirect Effects by Alternative

Eligible Rivers in the Suitability Study

The Wild and Scenic Rivers Study Report (Appendix J to this EIS) offers three alternatives for suitability consideration. These three alternatives are matched with the seven alternatives in this Final EIS. Table WSR-2 shows which alternatives from the study report correlate with which alternatives in the Final EIS.

Table WSR-2. Crosswalk of Alternatives in the Wild and Scenic River Study Report and the Final EIS

Wild & Scenic Rivers Study Report	Final EIS
Alternative 1	Alternative 1B and 5
Alternative 2	Alternative 2, 3, and 4
Alternative 3	Alternative 6
Combination of Alternatives 1 and 2	Alternative 7

Under Alternatives 1B and 5, none of the five river segments would be recommended for designation at this time, but they would remain eligible for future designation. Their free-flowing status and visual quality would be managed and protected under a Wild classification until a suitability study determined they were no longer eligible, or they were recommended to Congress for designation. At present, not all segments meet Wild standards. If the river segments were nominated under a Wild classification, restoration would be needed on some of the five river segments to bring them up to Wild standards.

Alternatives 2, 3, and 4 in this Final EIS would recommend all five rivers for designation as Wild and Scenic Rivers under the highest potential classification. Due to existing developments, these designations would include 85 miles of Wild, and 162 miles of Recreational classifications (see Table SWR-3). These alternatives would recommend a total of 247 miles of rivers be placed into the National Wild and Scenic Rivers System. This decision would eliminate the opportunity for major water resource development projects over the entire 247 miles of corridors and protect the free-flowing characteristics of all five rivers for perpetuity. The ORVs would receive a moderately high degree of protection. In the Wild segments, the commodity opportunities such as hydroelectric projects, mineral exploration and recreation developments, timber harvest, and road construction, would be mostly foregone. Major fish habitat improvement structures would be incompatible, but inconspicuous ones would be acceptable. In the Recreational segments, timber harvesting, prescribed fire, recreational development, road construction, and mineral entry would all be allowed at intensities commensurate with the classification. Grazing is allowed under all three classifications.

Table WSR-3. Eligible Wild and Scenic River Miles and Acres by Alternative

Classification	Miles/Acres	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Wild	River Miles	0	119	119	119	0	70	15
	Corridor Acres	0	37,421	37,421	37,421	0	22,294	4,111
Scenic	River Miles	0	0	0	0	0	0	0
	Corridor Acres	0	0	0	0	0	0	0
Recreational	River Miles	0	128	128	128	0	177	123
	Corridor Acres*	0	37,124	37,124	37,124	0	52,251	35,595

*Recreational corridors have much more private and state lands within them than Wild corridors. Private and state land acreage has been subtracted from the total river corridor area.

Alternative 6 in this Final EIS would also recommend all five rivers for designation as Wild and Scenic Rivers; however recommendations would be under the least restrictive potential classification. These designations would include 70 miles of Wild, and 177 miles of Recreational classifications (see Table SWR-3). These alternatives would recommend a total of 247 miles of rivers be placed into the National Wild and Scenic Rivers System. This decision would eliminate the opportunity for major water resource development projects over the entire 247 miles of corridors and protect the free-flowing characteristics of all five rivers for perpetuity. The ORVs would receive a moderate to high degree of protection, depending on the river's classification. In the Wild segments, the commodity opportunities such as hydroelectric projects, mineral exploration and recreation developments, timber harvest, and road construction, would be mostly foregone. Also, major fish habitat improvement structures would be incompatible, but inconspicuous ones would be acceptable. In the Recreational segments, timber harvesting, prescribed fire, recreational development, road construction, and mineral entry would all be allowed at intensities commensurate with this classification. Grazing is allowed under all three classifications.

Alternative 7 in this Final EIS would recommend two of the five rivers for Wild and Scenic River designation under the least restrictive classifications. This alternative would recommend a total of 138 miles of rivers be placed into the National Wild and Scenic Rivers System; 15 miles under a Wild classification, and 123 miles under a Recreational classification. Protection for the Secesh and South Fork Salmon River would eliminate the opportunity for major water resource development projects within their river corridors and protect the free-flowing characteristics of the three rivers for perpetuity. Outstanding remarkable values that made these rivers eligible for designation must be maintained, primarily under "Recreational" standards. Timber harvesting, prescribed fire, recreational development, road construction, and mineral entry would all be allowed, but at a potentially reduced amount to allow for scenic quality, water quality, and fisheries habitat protection.

Big Creek and Monumental Creek would not be recommended for designation, but would continue to receive protection of their outstanding remarkable values under existing Wilderness protection. The only substantive difference between Wilderness and Wild river designation is that the President can authorize hydroelectric projects in Wilderness, while Congress must approve such projects in a Wild river corridor. The few miles on each river that are not in the Wilderness would be removed from further study as unsuitable for designation. They may be opened to hydroelectric development, mineral entry, recreation development, major habitat structures, timber harvest, and road construction, depending on the MPC that is assigned to the area. The rivers would be managed in accordance with the prescription of adjacent lands, which in Alternative 7 is 3.2, emphasizing restoration and maintenance of aquatic, terrestrial, and watershed resources.

French Creek would not be recommended for designation. The river would be managed in accordance with the prescriptions of adjacent lands. Virtually this entire creek lies within inventoried roadless areas, and little if any development is currently planned that would affect its values or free-flowing status.

Eligible River Inventory

The list of rivers eligible for Wild and Scenic River designation is an inventory that does not vary by alternative. However, the criteria used to determine eligibility can vary based on geographical attributes and the Region of Comparison used (refer to Appendix D in the revised Forest Plans for Region of Comparison information).

A three Forest interdisciplinary team re-evaluated the Regions of Comparison and the ORV criteria to ensure they were national or regional in scope, as mandated by the Wild and Scenic Rivers Act, and that the criteria had been applied consistently by resource specialists throughout the Ecogroup. During this re-evaluation some changes were made to the Regions of Comparison and ORV criteria. This re-evaluation also determined that the criteria used to assess ORVs had been inconsistently applied. The following summary describes the changed criteria used to determine ORVs and their associated Regions of Comparison. The *Southwest Idaho Ecogroup Wild and Scenic River Eligibility Inventory User's Guide* (USDA Forest Service 2001) has a full discussion of criteria components (see project record).

Presence of Outstandingly Remarkable Values by Classification

Tables WSR-4, WSR-5, and WSR-6 shows the segments, lengths, and classifications of all rivers determined to be eligible in the eligibility study for the Boise, Payette, and Sawtooth Forests.

Table WSR-4. Boise National Forest Eligible Wild and Scenic Rivers Miles by Segment Classification

River	Segment	Classification	Segment Miles
Bear Valley Creek	1	Recreational	21.81
Bear Valley Creek	2	Scenic	7.65
Bear Valley Creek	3	Wild	3.76
Burntlog Creek	1	Recreational	1.92
Burntlog Creek	2	Wild	10.86
Deadwood River	1	Recreational	21.74
Deadwood River	2	Scenic	1.93
Deadwood River	3	Wild	13.00
Deadwood River	4	Scenic	8.58
Elk Creek (Feather River)	1	Wild	5.13
Elk Creek (Feather River)	2	Scenic	2.24
Elk Creek (Bear Valley Ck)	1	Recreational	9.78
Elk Creek (Bear Valley Ck)	2	Wild	8.20
Johnson Creek	1	Recreational	2.93
Middle Fork Boise River	1	Recreational	52.14
Middle Fork Payette River	1	Recreational	12.20
Middle Fork Payette River	2	Wild	8.97
Mores Creek	1	Recreational	1.23
North Fork Boise River	1	Recreational	4.93
North Fork Boise River	2	Wild	8.31
North Fork Boise River	3	Wild	9.36
North Fork Payette River	1	Recreational	12.45
Payette River	1	Recreational	2.53
Porter Creek	1	Wild	7.13
South Fork Boise River	1	Recreational	13.13

River	Segment	Classification	Segment Miles
South Fork Boise River	2	Scenic	3.13
South Fork Boise River	3	Wild	12.27
South Fork Payette River	1	Scenic	6.49
South Fork Payette River	2	Recreational	30.91
South Fork Payette River	3	Scenic	3.12
South Fork Payette River	4	Recreational	13.29
Total Boise National Forest Eligible WSR Miles			**321.12**

Table WSR-5. Payette National Forest Eligible Miles by Segment Classification

River	Segment	Classification	Segment Miles
Hard Creek	1	Wild	10.65
Hazard Creek	1	Wild	.75
Hazard Creek	2	Wild	13.65
Total Payette National Forest Eligible WSR Miles			**25.05**

Table WSR-6. Sawtooth National Forest Eligible Rivers Miles by Segment Classification

River	Segment	Classification	Segment Miles
Alpine Creek	1	Wild	4.03
Alturas Lake Creek	1	Scenic	8.21
Alturas Lake Creek	2	Recreational	7.99
Baron Creek	1	Wild	8.54
Beaver Creek	1	Scenic	8.37
Big Wood River	1	Recreational	27.98
Boulder Chain Lakes Creek	1	Wild	4.39
Box Canyon Creek	1	Wild	3.39
East Fork Salmon River	1	Wild	4.13
East Fork Salmon River	2	Recreational	5.83
Elk Creek	1	Wild	10.23
Elk Creek	2	Scenic	3.55
Fishhook Creek	1	Wild	5.35
Fishhook Creek	2	Recreational	1.43
Germania Creek	1	Scenic	4.19
Germania Creek	2	Wild	10.77
Goat Creek	1	Wild	7.85
Goat Creek	1	Wild	2.48
Goat Creek	2	Recreational	2.32
Hell Roaring Creek	1	Wild	2.18
Hell Roaring Creek	2	Scenic	3.73
Little Boulder Creek	1	Wild	7.40
Middle Fork Boise River	1	Wild	10.28
Muldoon Creek	1	Wild	3.43
North Fork Big Wood River	1	Wild	5.72
North Fork Big Wood River	2	Recreational	5.75
North Fork Boise River	1	Wild	9.10
North Fork Hyndman Creek	1	Wild	4.61
Pettit Lake Creek	1	Wild	3.76
Pettit Lake Creek	2	Scenic	1.28
Redfish Lake Creek	1	Wild	6.78

River	Segment	Classification	Segment Miles
Redfish Lake Creek	2	Recreational	2.74
Salmon River	1	Recreational	68.33
South Fork Boise River	1	Recreational	37.06
South Fork East Fork Salmon River	1	Wild	5.88
South Fork Payette River	1	Wild	2.54
South Fork Payette River	2	Scenic	17.89
Stanley Lake Creek	1	Wild	3.74
Stanley Lake Creek	2	Scenic	3.50
Stanley Lake Creek	3	Scenic	3.20
Trail Creek	1	Recreational	14.47
Warm Springs Creek	1	Wild	22.35
West Fork East Fork Salmon River	1	Wild	5.42
West Fork North Fork Big Wood River	1	Wild	4.51
West Pass Creek	1	Scenic	6.24
Yellow Belly Lake Creek	1	Wild	7.97
Total Sawtooth National Forest Eligible WSR Miles			**400.89**

Each eligible river was classified as Wild, Scenic, or Recreational based on this criteria:

- **Wild** – Rivers or sections of rivers are free of impoundments, with watershed or shorelines essentially primitive; they generally are inaccessible except by trail, with undisturbed landscapes.
- **Scenic –** Rivers or sections of rivers are free of impoundments, with watersheds or shorelines still largely primitive and undeveloped; they can be accessible in places by inconspicuous, well-screened local roads.
- **Recreational –** Rivers or sections of rivers are readily accessible by road or railroads and have some degree of development along their shorelines where minor structures are allowed, providing that the waterway generally remains natural in appearance.

For further information including segment location and outstandingly remarkable values please refer to the Appendix D in the revised Forest Plans.

Tables WSR-7 through WSR-12 show the amount of total acres, acres in Inventoried Roadless Areas, acres in Wilderness Areas, acres in Recommended Wilderness Areas, and acres within the Sawtooth National Recreation Area (NRA). The tables are arranged by classification, as the management activities allowed vary by classification (see Table WSR-1).

Table WSR-7. Eligible River Corridor Acres by Classification

Classification	Boise NF Acres	Payette NF Acres	Sawtooth NF Acres	Ecogroup Total
Wild	25,945	7,442	56,706	**90,093**
Scenic	9,461	0	13,202	**22,663**
Recreational	55,429	0	51,008	**106,437**
Total	**90,835**	**7,442**	**120,916**	**219,913**

Table WSR-8. Eligible River Corridor Acres in Inventoried Roadless Areas by Classification

Classification	Boise NF Acres	Payette NF Acres	Sawtooth NF Acres	Ecogroup Total
Wild	16,685	4,976	29,792	**51,453**
Scenic	2,498	0	6,641	**9,139**
Recreational	18,329	0	10,928	**29,257**
Total	**37,512**	**4,976**	**47,361**	**89,849**

Table WSR-9. Eligible River Corridor Acres in Wilderness Areas by Classification

Classification	Boise NF Acres	Payette NF Acres	Sawtooth NF Acres	Ecogroup Total
Wild	4,534	2,999	25,355	32,888
Scenic	930	0	61	991
Recreational	38	0	55	93
Total	**5,502**	**2,999**	**25,471**	**33,972**

Table WSR-10. Eligible River Corridor Acres in Recommended Wilderness Areas by Classification

Classification	Boise NF Acres	Payette NF Acres	Sawtooth NF Acres	Ecogroup Total
Wild	2,393	2,286	24,766	29,445
Scenic	0	0	1,827	1,827
Recreational	1,460	5,122	955	7,537
Total	**3,853**	**7,408**	**27,548**	**38,809**

Table WSR-11. Eligible River Corridor Acres in the Sawtooth NRA by Classification

Classification	SNRA Acres
Wild	27,555
Scenic	13,118
Recreational	32,790
Total	**73,463**

Wild and Scenic River designation has the potential to affect the number of acres available for timber production. According to the Wild and Scenic River Designation Standards, in river corridor classified as Wild, there should be little or no evidence of past timber harvest, and no ongoing timber harvest. In accordance with these standards, the river corridors are not considered part of the suited base. Corridor acres are displayed by classification in WSR-12 below. The Wild acres in the suited timber base will no longer be considered suited.

Vegetation management could reduce the potential for future eligibility and classification by negatively affecting vegetation screening, scenery, and recreational values, and by constructing access roads. However, vegetation management could also be used to improve scenery and recreational values over time, which could benefit eligibility potential over the long term. Vegetation management activities may also be necessary to address forest health and public safety concerns. Timberlands that fall within the Wild and Scenic River corridor for rivers with a wild classification have been removed from the suited timber base.

Cumulative Effects

Cumulative Effects are analyzed in two different ways in this section. First, the amount of eligible Wild and Scenic River segments are calculated to show the maximum potential for effects under each alternative. Then, the amount of eligible rivers are compared to the current nationally designated Wild and Scenic Rivers to show the potential maximum relative contributions each alternative would make to the National System.

Table WSR-12 shows the cumulative amount of river miles and acres of river corridors for eligible Wild and Scenic River segments on the three Forests by alternative and classification.

Table WSR-12. Cumulative Eligible WSR Miles and Acres by Alternative

Classification	Miles/Acres	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Wild	River Miles	294.4	413.4	413.4	413.4	294.4	364.4	309.4
	Corridor Acres	90,093	127,514	127,514	127,514	90,093	112,387	94,204
Scenic	River Miles	78.0	78.0	78.0	78.0	78.0	78.0	78.0
	Corridor Acres	22,663	22,663	22,663	22,663	22,663	22,663	22,663
Recreational	River Miles	375.0	503.0	503.0	503.0	375.0	552.0	498.0
	Corridor Acres*	106,437	143,561	143,561	143,561	106,437	158,688	142,032

Table WSR-13 shows the maximum number and miles of suitable and eligible river segments in the Ecogroup area and their potential contribution to the National Wild and Scenic River System by alternative. This contribution is expressed as a percentage of the national system numbers.

Table WSR-13. Potential Ecogroup Forest WSR Contribution to the National System

Indicator	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Current number of rivers in National Wild and Scenic River System	160	160	160	160	160	160	160
Number of suitable & eligible rivers in the Ecogroup area	55	55	55	55	50	55	52
Percent of Ecogroup area contribution to National System	26%	26%	26%	26%	24%	26%	24%
Current miles of rivers in National Wild and Scenic River System	11,292	11,292	11,292	11,292	11,292	11,292	11,292
Miles of suitable and eligible rivers in the Ecogroup area	747.4	994.4	994.4	994.4	747.4	994.4	885.4
Percent of Ecogroup area contribution to National System	6%	8%	8%	8%	6%	8%	7%

Socio-Economic Environment

INTRODUCTION

The socio-economic environment for Forest Plan revision encompasses the local, state, national, and sometimes international settings that affect counties, communities, economies, and natural resource policies in the Southwest Idaho Ecogroup (Ecogroup) area. Social and economic analyses are conducted by the Forest Service to determine what effects the agency has on local communities and the people using natural resources. The human dimension is an important part of ecosystem management, and impacts on community residents and economies will be considered in resource decisions made in the Forest Plan revision.

A social impact is a change in social and cultural conditions that directly or indirectly results from a Forest Service action. The objective of social impact analysis is to identify potential public needs and concerns that resource managers must consider in decision-making. These needs and concerns are also intended to inform decision-makers and the public of potential social effects that may occur as a result of Forest Service actions. Social and economic impacts are closely linked and interdependent. However, social impacts focus on cultural and lifestyle changes that may occur, while economic impacts occur when Forest Service actions directly or indirectly change the employment and/or income in an area.

Just as the Forest Service can directly or indirectly affect social and economic conditions, the agency is also affected by changes in economies, as well as changes in attitudes, values, and public desires, at both local and national scales. Conflicting opinions over the uses of public lands have increased the complexity of National Forest management, the number and types of laws governing natural resources, such as the Endangered Species Act and the Clean Water Act, and the judicial interpretation of those laws. In many cases these changes have narrowed the decision space available to local managers.

Issues and Indicators

Issue Statement 1 - Forest Plan management strategies may have social and economic effects on local counties and communities.

Background to Issue 1 - The socio-economic environment is not directly linked to any of the Need For Change topics found in the Preliminary AMS Summary (USDA Forest Service 1997) for the Ecogroup Forest Plan revision. However, nearly all Forest management activities have the potential to directly or indirectly affect the socio-economic environment (chiefly counties and communities). These activities are related to, or could be implemented under, all alternatives.

Indicators for Issue 1 - Indicators for this issue include county populations; community employment and income; lifestyles; attitudes, beliefs and values; social organization; land-use patterns, and civil rights. These indicators correspond to the variables identified in Forest Service Manual (FSM) 1973.2 and Forest Service Handbook (FSH) 1909.17 for social and economic analyses.

Issue Statement 2 – Forest Plan management strategies may affect the financial efficiency of operating the Ecogroup National Forests.

Background to Issue 2 – The financial efficiency of operating National Forests is of great concern to the Forest Service and public alike. Controversy has swirled in recent years around such financial issues as "below-cost" timber sales, "subsidized" grazing, and recreation facilities that are deteriorating due to lack of maintenance or replacement funding. Financial efficiency is measured by comparing estimated revenues or receipts where money changes hands to actual or estimated costs. Revenues included in this analysis were estimated monies collected at developed campsites, receipts for timber purchases, and monies received for livestock grazing and ski area permits. The costs used in this analysis were derived from the estimated budget costs at the experienced budget levels for FY 2000. The analysis compares the financial efficiency of the seven alternatives over a 50-year period. Estimates for the calculations were determined using information from budget ledgers and forest files and entered into *Quick-Silver Investment Analysis*, an economic computer model program, to calculate the results.

Indicators for Issue 2 - Present Net Value (PNV) and revenue/cost ratio for the Boise, Payette, and Sawtooth National Forests are measured over a 50 year time period. The main indicator used in financial efficiency analysis is Present Net Value (PNV). PNV is an index in which discounted costs are subtracted from discounted revenues. Another indicator used is the revenue-to-cost or revenue/cost ratio, in which discounted revenues are divided by discounted costs. Ratios greater the one indicate that revenues exceed costs, and ratios less that one indicate that costs exceed revenues.

Affected Area

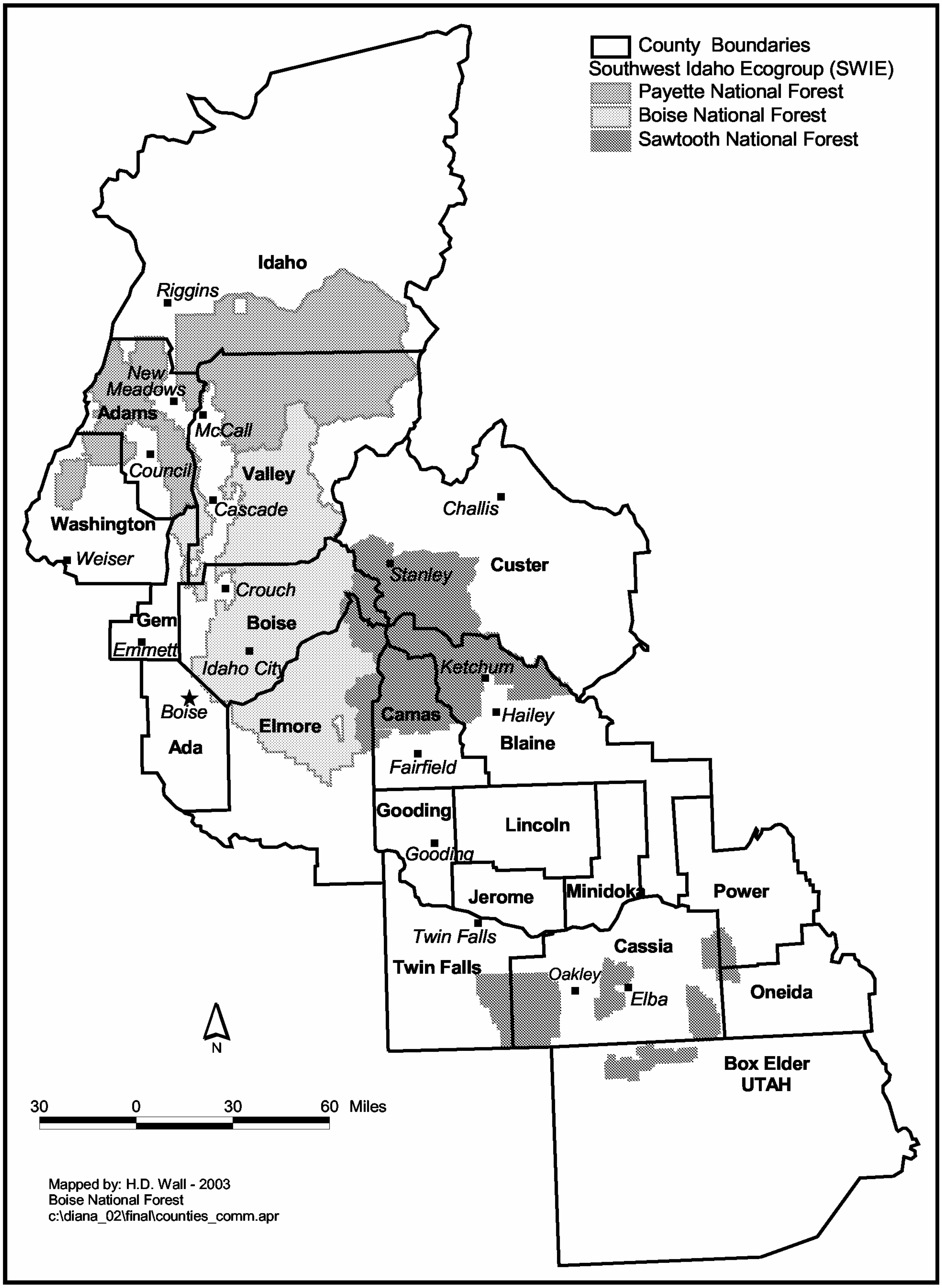
As noted above, Forest Plan revision can both *influence* and *be influenced by* social and economic conditions at several scales. The "Current Conditions" discussion centers on 17 counties and 19 communities within the Ecogroup area. However, it also describes national/international settings, regional aspects, and some socio-economic characteristics of Idaho. There are at least two reasons to include these larger perspectives: first, technological advances and economic development have rapidly increased global communication and large-scale trade, and second, decisions made at a national level increasingly have tangible, site-specific impacts on local landscapes and communities.

The 17 counties are Ada, Adams, Blaine, Boise, Camas, Canyon, Cassia, Custer, Elmore, Gem, Gooding, Idaho, Lincoln, Power, Twin Falls, Valley and Washington.

The 19 communities are Cascade, Challis, Council, Crouch/Garden Valley, Emmett, Fairfield, Gooding, Hailey/Bellevue, Idaho City, Ketchum/Sun Valley, McCall/Donnelly, New Meadows, Oakley Valley, Raft River Valley, Riggins, Stanley, Treasure Valley (including Boise and surrounding communities), Twin Falls, and Weiser.

Economic profiles of 10 other communities were also assessed. Although lack of extensive socio-economic data (and space) prevented them from being included in this discussion or the socio-economic overview, the economic profiles for these communities are included in the

Figure SO-1. Southwest Idaho Ecogroup Counties and Communities



planning record. These communities are Warren, Yellow Pine, Big Creek, Lowman, Horseshoe Bend-Placerville-Banks, Cambridge-Midvale, Fun Valley/Pine-Featherville-Rocky Bar-Atlanta, Carey-Picabo, Shoshone, and Rockland.

Although this discussion covers national, international, regional, and state scales, it focuses on counties and communities, in part because there is much public and internal concern about how changes in National Forest management could affect rural communities. In addition, there is growing recognition that the community, defined in a place-specific sense, is the basic unit of social analysis (Committee of Scientists 1999). A map of the 17 counties and 19 communities is included as Figure SO-1.

CURRENT CONDITIONS

The current condition discussion is organized to reflect the different scales at which social and economic changes related to National Forest uses and policies are occurring. Consequently, this discussion addresses:

- National/international settings and issues (including relationships with Native American Indian tribes);
- Regional issues, as reflected by information gathered through the Interior Columbia Basin Ecosystem Management Project (ICBEMP);
- Socio-economic characteristics and changes in Idaho;
- Socio-economic characteristics and changes in affected counties;
- Socio-economic characteristics and changes in representative affected communities.

National and International

This section describes the national issues surrounding National Forest issues in southwest Idaho. The Forest Service's important government-to-government relationship with Native American Indian tribes is discussed elsewhere in this EIS.

National Issues About National Forest Uses

The 1990s were characterized by continued and increasing public interest in National Forest management. Early in the decade, the National Forests marked their centennial, and the anniversary sparked discussion about the future of the National Forests. As part of the 1991 Centennial of the National Forests, the Pinchot Institute for Conservation convened a seminar to discuss the idea of "land stewardship"" as a guiding ethic for the next century of Forest management. The seminar defined "land stewardship" as including a moral imperative, with management activities designed and implemented within the physical and biological capabilities of the land, and a focus on desired future conditions rather than short-term resource output targets (Sample 1991).

Through the 1990s, policy and social changes affected the types of management undertaken on national forests. Policy changes included the definition and adoption of an ecosystem management approach, and implementation of environmental laws such as the Endangered

Species Act and the Clean Water Act at regional and local levels. Simultaneously, outdoor recreation increased throughout the country, and government agencies were and continue to be responsible for much of the land that is available for outdoor recreation activities (Cordell et al. 1997).

In addition, there has been a significant change in timber supply behavior throughout the western U.S. caused by a harvest policy shift on public forests. Initially, protection for the spotted owl and old growth forest stimulated the Federal Ecosystem Management Assessment Team (FEMAT) forest management analysis. Under FEMAT option 9, national forest harvests were reduced significantly in western Oregon and Washington. During the late 1980s, logs flowed from interior markets to higher paying mills in coastal markets. In the early 1990s, interior national forests also began reducing harvests due to salmon protection, environmental appeals of timber sales, and a shift to ecosystem management. Southwest Idaho national forests were among the last to reduce harvest levels in the three-state Pacific Northwest. Their harvest levels were maintained by salvage sales from two significant fire years (McKetta 1999).

With these and related changes, the Forest Service's traditional emphases on timber production, road construction, and livestock grazing shifted in recent years. Policy developments and proposals indicate this difference:

- In February 1999, an 18-month moratorium on road construction in roadless areas ("Interim Roads Rule") was implemented, pending development of a long-term policy for the National Forest transportation system (USDA Forest Service 1999). A long-term roads policy was issued in January 2001. Forest Service regulations developed for this policy were revised through "interim directives" in May and December 2001. The December 2001 interim directive included language to emphasize and clarify local managers' discretion and flexibility when implementing roads analysis.

- A March 1999 report by the Committee of Scientists, convened to review the Forest Service's land and resource management planning process, stated that "he first priority for management is to retain and restore the ecological sustainability of these watersheds, forests, and rangelands for present and future generations"(Committee of Scientists 1999). The Forest Service used this report, as well as emphasis on collaborative efforts, to frame the new proposed planning regulations. The final regulations were adopted in November 2000. In May 2001 the Department of Agriculture determined that the Forest Service was not sufficiently prepared to implement the new planning rule throughout the agency, and it gave Forests the option to use the previous 1982 planning regulations or the new regulations, until May 2002. Proposed new planning regulations were released for public comment in December 2002.

- In October 1999, then-President William Clinton directed the Forest Service to "begin an open and public dialogue about the future of inventoried roadless areas within the National Forest System." (USDA Forest Service 1999). The Forest Service published a Notice of Intent to prepare an Environmental Impact Statement (EIS), citing a two-part proposal. A Final Environmental Impact Statement (FEIS) for the Roadless Area Conservation proposed rule was released in November 2000 following public comment, and the final rule was issued in January 2001. The final rule included a prohibition on new road construction and reconstruction, and most timber harvest, in inventoried roadless areas. The final rule was the subject of several lawsuits. In June and December 2001, the Forest Service issued direction that enabled only the Chief of the Forest Service, and in some cases, the Regional Foresters, to approve or disapprove road construction or reconstruction, and most timber harvest, in inventoried roadless areas, until Forest Plans are revised. In December 2002, the Ninth Circuit Court of Appeals reversed the May 2001 ruling by the U.S. District Court for the District of Idaho, which enjoined the Department from implementing the Roadless Area Conservation Rule. The Forest Service is working with the USDA Undersecretary for Natural Resources and Environment and the Department of Justice to review the decision.

- In March 1998, then-Forest Service Chief Mike Dombeck unveiled a natural-resource agenda for the 21st century, citing as its premise "a gradual unfolding of a national purpose." The agenda focused on four key areas: watershed health and restoration, sustainable forest ecosystem management, forest roads, and recreation (Dombeck 1998).

- In April 2001, Dale Bosworth succeeded Mike Dombeck as Chief of the Forest Service. In May 2001, the new Chief articulated key themes of his leadership, including providing the support and resources for "on-the ground" work, reconnecting the headquarters with the field, and empowering local decision-making. He also discussed a commitment to the National Fire Plan, a comprehensive strategy for ecosystem protection, hazardous fuels reduction, and wildfire recovery developed in response to the wildfires of 2000, as well as to continuing the improvement of the Forest Service's financial accountability (Bosworth 2001).

  Bosworth's vision was further articulated in a December 2001 speech in Boise, sponsored by the Andrus Center for Public Policy. Bosworth noted his belief that changes in regulations could help with the "gridlock" that he believes has recently prevented the Forest Service from completing many projects. He also noted support for "local solutions to national issues," rather than "local control" (Barker 2001).

As the Agency's traditional revenue-producing activities have decreased, interest remains in generating revenue, reducing costs, and improving accountability for financial management and performance. This interest is reflected in various public forums, including recent reports prepared by the General Accounting Office (GAO), a research arm of Congress. For example, one report identifies an increasing shift in emphasis in the Forest Service's plans from producing timber to sustaining wildlife and fish, due in part to changing public values and concerns. However, the report also finds that Congress has "never explicitly accepted this shift in emphasis or acknowledged its effects on the availability of other uses on national forests" (U.S. General Accounting Office 1997, GAO/T-RCED-97-81, p. 9).

Recent changes in National Forest policy have been met with great interest and as much controversy. Many public comments reflect concerns about the purpose and mission of the national forests and the social effects of changing policies, at scales ranging from local to international, both short and long term:

- Some believe recent changes favor animals and plants over humans, citing positive impacts of timber harvest on local communities and landscapes and arguing that National Forest timber harvest provides high-paying employment and the ability for several generations to support families (Wright 1998). Others believe that timber harvest creates environmental degradation, and that recent economic and population growth in the Pacific Northwest is due to its natural landscapes and environmental features (Power 1999).

- Some believe the reduction of wood from the National Forest System is likely to further accelerate the rate of net import of wood and wood products in the United States, thereby accelerating the rate of inappropriate harvesting of tropical rainforests and the extinction of species therein (Howe 1998). Others call for a complete end to commercial logging of National Forest System lands (Juel 1998).

- Some perceive that there is an “ecocentric” value system now imposed on National Forest management, and that trails, roads, and human access are an integral part of habitat (Cook 1998). Some believe that state and county officials should dictate the uses of public lands within a state (Pettit 1998).

- While some environmental groups believe all livestock grazing is environmentally destructive, other argue that ranchers can monitor land and wildlife conditions that otherwise would be neglected by short-staffed agencies. In addition, some cite the social and ethical strength of ranching communities that knit neighbors tightly and securely together (Knize 1999).

Interior Columbia Basin Ecosystem Management Project (ICBEMP)

In July 1993, then-President Clinton directed the Bureau of Land Management (BLM) and the Forest Service to develop a scientifically sound, ecosystem-based management strategy for lands they administer in the Columbia River Basin. This project is called the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The ICBEMP addresses biophysical and social systems across 76 million acres of land administered by the Forest Service and BLM, including federal lands in Idaho. ICBEMP’s charter included the provision of broad, ecosystem-wide data and program direction in support of finer-scale analyses at the national forest and project levels.

The proposed ICBEMP management strategy generated nearly 83,000 public comments, many of which addressed the project’s social and economic aspects:

- While some agreed that a broad-scale evaluation was needed to improve the ecological health of the Columbia River Basin, many believed this approach and direction was inadequate to analyze and manage an area so vast, complex, and diverse.

- Commodity resource businesses, and those working within local-resource dependent communities, believed that a final plan would not ensure a sustainable and predictable level of products and services, but rather that their jobs, families, and community stability would be jeopardized.

- Many also felt the project represented a massive Federal takeover that threatened to depopulate the Northwest, lock up public lands, and steal state and local power in favor of federal or even international control.

- Others believed the project promoted a "top-down" management philosophy, which fails to adequately consider economic or social consequences (USDA/USDI 1998).

Social and Economic Issues in the ICBEMP

Social and economic conditions and effects were addressed in several ICBEMP-associated studies, and the project noted that both regional and local information was important (USDA/USDI 1997).

The ICBEMP studies included information for both the Basin as a whole and for smaller units such as counties and communities. For example, people's attitudes, beliefs, and values about ecosystem management, endangered species, and trust levels in government agencies were assessed by surveying residents across the region. Results of these surveys indicated that many people believe there are problems with ecosystem health in the Basin, that support for endangered species laws and regulations may have decreased slightly but remains strong, and that trust levels in government agencies were generally low (Quigley and Arbelbide 1997).

The following four paragraphs discuss the ICBEMP economic approach, as summarized from the 1999 "Affected Economic Environment and Baseline for the No-Action Alternative," developed by Economic Modeling Specialists, Inc. (Robison and Gneiting 1999) for this Forest Plan revision process. This document is available in the planning record.

Starting at the broad, Basin-wide scale of analysis, ICBEMP analysts characterized the regional economy as "healthy, diverse and adaptable." However, a finer scale county and community-level inspection of the data shows that the region followed the national trend, with the bulk of recent growth occurring at the urban centers. ICBEMP reports noted that rural areas generally lagged in growth, resilience, and well-being, and concluded that " . . . some of the counties and communities do not have strong, robust economies." (McGinnis and Christensen 1996, Robison and Gneiting 1999).

The ICBEMP analysis of future economic conditions includes exploration of a non-traditional amenity-led theory of economic growth (USDA Forest Service and USDI BLM, no date). Traditional regional growth theory suggests that population follows jobs. In contrast, amenity-led growth occurs when job seekers select living locations based on quality of life considerations. In other words, amenity-led growth theory concludes that jobs follow population (Robison and Gneiting 1999).

Sometimes quality-of-life seekers supply their own jobs. Along with information age occupational trends and technologies, futurists see an increase in telecommuting, and the rise of entrepreneurs that are less place-dependent than employees of the past. The important point is that these persons are largely locationally independent, and according to amenity-led growth advocates, they will choose their living locations based on quality of life criteria (Robison and Gneiting 1999).

Finally, the aging baby-boom generation translates to a demographic rise in the numbers of retirees. Like the telecommuter or entrepreneur, the location decision of this population is independent of work place considerations. And according to amenity-led growth advocates, they will choose based on quality of life criteria. Jobs and incomes will be created in sectors catering to the growing retired population. In addition, ICBEMP analysts concluded that the rural portions of the Columbia Basin exhibit significant outdoor amenities and thereby are candidates for significant amenity-led growth (Robison and Gneiting 1999).

ICBEMP Socio-economic Findings for SWIEG Counties and Communities

Information such as economic and social resiliency, and timber/forage importance were assessed for counties and/or communities by the ICBEMP. The ICBEMP also described 12 lifestyles found in rural areas or small communities within the interior Columbia Basin, ranging from small-town, blue-collar families to retirement town seniors (Quigley and Arbelbide 1997). Although these 12 "lifestyle segments" are diverse, they seem to share a common characteristic: an attraction to the natural setting of their communities. The supplemental draft environmental impact statement (SDEIS) for the ICBEMP, released in March 2000, recognized that small rural communities were of particular focus, finding that these communities were, as a whole, more subject to potential effects from external forces such as changing technology, population fluxes, and changes in historical land use policies, including those currently underway in the Forest Service (USDA Forest Service and USDI BLM 2000).

The ICBEMP also discussed the challenges presented by locations known as the urban-rural wildland interface, where developed lands meet undeveloped public lands, and where recent and projected population growth is particularly high. The resulting growth in the number of residential dwellings near forested landscapes presents new challenges in fire prevention and suppression, and has the potential to fragment wildlife habitat and increase conflicts with wildlife. A map in the SDEIS showing urban-rural wildland interface in relation to fire risk indicates parts of Adams, Boise, and Valley Counties are at particular risk (USDA Forest Service and USDI BLM 2000).

More information on the social and economic conditions, and anticipated effects of the ICBEMP, is found in the ICBEMP documents, included in the Forest Plan revision planning record.

Economic and Socioeconomic Resiliency, Timber/Forage Importance. Table SO-1 illustrates economic resiliency, socio-economic resiliency, and timber/forage importance for several Ecogroup area counties. Economic resiliency was measured by the diversity among employment sectors, with the assumption that people in high resiliency counties have ready access to a range of employment opportunities if specific firms or business sectors experience downturns (Quigley et al. 1996). Socio-economic resiliency was assessed by combining population density, economic resiliency, and lifestyle diversity (Quigley et al. 1996).

A timber/forage importance index was developed to show the historical relationships between agency land uses and local economic activity (USDA Forest Service and USDI BLM 1997). However, the ICBEMP SDEIS noted that the timber/forage index developed in 1997, while interesting, did not prove to be as useful as desired. Specifically, the index was not very helpful for assessing the ability of counties and communities to adapt to change – in particular, to changes from federal land use policies and related management actions in the project area (USDA Forest Service and USDI BLM 2000).

The ICBEMP analysis determined that, of the 17 counties in or near the Ecogroup area, Ada, Canyon, and Twin Falls Counties are considered to have high economic and socio-economic resiliency, with low timber/forage importance noted in Ada and Canyon Counties. Ada County is Idaho's most populous, and together with Canyon County, encompasses Boise, the state's capital, and the surrounding communities that comprise "the Treasure Valley." Cassia, Gem, and Gooding Counties showed moderate levels of socio-economic resilience, while the remaining counties exhibited low levels. Adams, Boise, Camas, Custer, and Idaho Counties all showed low levels of socio-economic resiliency, and high levels of timber/forage importance.

Table SO-2 shows community resilience indices for Ecogroup area communities. Social resilience was largely assessed at the community level, because of local interest in the future of their communities (Quigley et al. 1996). Although counties such as Custer, Idaho, and Adams showed low levels of socio-economic resiliency, communities within these counties, such as Stanley, Clayton, and Cascade, showed a high community resilience index.

Attitudes, Beliefs, and Values Toward Natural Resources and Public Land Management. As a main information source for public attitudes towards natural resource issues, ICBEMP used the Survey of Natural Resource Issues on Public Lands in the West, conducted in the summer of 1994 by scientists at Utah State University, Oregon State University, and Washington State University. Four populations were sampled, including people living in Columbia Basin counties east of the Cascades, those living west of the Cascades, the national public, and those who participated in some way in the Eastside Ecosystem Management Project.[1] Although response rates were generally low, the data helped identify the range and types of attitudes, beliefs, and values that people hold (Quigley and Arbelbide 1997).

The survey asked respondents to rank the three most important factors to them and their families, from a list of 17 factors concerning the future of public lands in the interior Columbia Basin. The most important factor for all four sampled populations was resources for future generations. Next important factors for eastside residents were quality place to live, followed by outdoor recreation and wildlife habitat. Wilderness and wild and scenic rivers were rated as less important than hydropower and agriculture.

The ICBEMP SDEIS notes a 1995 survey by Harris and Associates. This survey showed a larger percentage of respondents from small towns and rural areas in Idaho, Oregon, and Washington believe current government policies tend to favor the environment too much over jobs, as compared to their suburban counterparts. This 1995 poll also found that support for increased environmental protection is greater when state or local governments, rather than the federal government, take the initiative (USDA Forest Service and USDI BLM 2000).

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[1]As part of the ICBEMP, environmental impact statements were developed for two planning areas. The planning area for the Eastside project includes about 30 million federally-managed acres in the interior Columbia River basin, upper Klamath Basin, and northern Great Basin that lie east of the crest of the Cascade Range in Oregon and Washington. The Ecogroup area lies in the second planning area, the Upper Columbia River Basin area.

The SDEIS also discusses "sense of place" as a value to be considered in ecosystem management. "Sense of place" refers to the way people define specific locations based on meanings and images. The concept of place has not been widely or uniformly used by the Forest Service or other federal land management agencies. However, the ICBEMP cites studies that recommend that "sense of place" should be assessed at a community level.

Table SO-1. ICBEMP Resilience Ratings and Timber/Forage Importance of Counties in the Southwest Idaho Ecogroup Area

County	ICBEMP Economic Resiliency[1]	ICBEMP Socio-economic Resiliency[2]	ICBEMP Timber/Forage Importance[3]
Ada	High	High	Low
Adams	Low	Low	High
Blaine	Moderate	Low	Low
Boise	Low	Low	High
Camas	Low	Low	High
Canyon	High	High	Low
Cassia	Moderate	Moderate	N/A
Custer	Low	Low	High
Elmore	Low	Low	Moderate
Gem	Moderate	Moderate	N/A
Gooding	Moderate	Moderate	N/A
Idaho	Moderate	Low	High
Lincoln	Low	Low	Moderate
Power	Low	Low	N/A
Twin Falls	High	High	Moderate
Valley	Moderate	Low	Moderate
Washington	Moderate	Low	N/A

All ratings represent relative estimates of resiliency and/or importance, rather than absolute descriptors.

[1]Based on employment diversity. However, economic resiliency ratings are higher when measured based on Bureau of Economic Analysis (BEA) regions instead of counties (Quigley et al. 1996).

[2]Sum of equally-weighted ratings for economic resiliency, population density, and lifestyle diversity (Quigley et al., 1996). The same ratings for socio-economic resiliency are provided in Table 3, included in Appendix 7 of the ICBEMP SDEIS.

[3] Factored from percent federal land, percent timber from National Forests, percent forage from federal land, percent population change (1980-1992), percent natural resource employment, economic diversity, percent federal payments. Not assessed for all counties. Source: USDA Forest Service and USDI BLM, 1997.

Table SO-2. ICBEMP Community Resilience Index for Communities in the Southwest Idaho Ecogroup (after Harris et al. 1996)

County	Communities	Community Resilience Index (ICBEMP)*
Ada	Meridian	High
Adams	New Meadows	Moderately low
Blaine	Ketchum Bellevue Hailey	High Moderately low High
Boise	Idaho City	Low
Camas	N/A	N/A
Canyon	Parma	Low
Cassia	Declo	High
Custer	Stanley Clayton	High High
Elmore	Mountain Home	High
Gem	Emmett	High
Gooding	Bliss Hagerman	Moderately low Low
Idaho	Riggins Grangeville Kooskia Ferdinand	High Moderately high High Moderately low
Lincoln	Richfield	Moderately high
Power	N/A	N/A
Twin Falls	Filer	Low
Valley	Cascade Donnelly	High Moderately low
Washington	Weiser	Moderately high

The 1996 Harris et al. study was developed under contract as part of the ICBEMP.

N/A = not analyzed in this study.

*Determined through five factors: amenity scale, civic leadership scale, economic structure scale, preparedness for future scale, social cohesion scale. Source: "Rural Communities in the Inland West: Characteristics of Small Towns in the Interior and Upper Columbia River Basins: An Assessment of the Past and Present" Harris et al. 1996; University of Idaho. Listed towns are those examined in the study, *not* all of those in the county.

Idaho

Social and Economic Overview - Idaho includes abundant mountains, lakes and streams, with a four-season climate averaging 230 days of sunshine per year. About 33 million acres (64 percent) of the state is federally owned and managed by the Forest Service and the BLM under a multiple-use mandate. As the thirty-ninth most populated state, Idaho has traditionally been largely rural and agriculturally oriented.

But over the last decade, the state's keyword has been "change." With an estimated 2000 population of nearly 1.3 million, Idaho grew by 28.5 percent between 1990 and 2000 (U.S. Bureau of the Census 2001), making it the fifth-fastest growing state in the country, behind four other western states – Nevada, Arizona, Colorado and Utah (U.S. Bureau of the Census 2001).

Idaho's population is not evenly distributed throughout the state. About half of Idaho's residents live in southwest and south-central Idaho, with 33 percent of the state's population in the counties that include or surround Boise, the state's capital and largest city (Idaho Dept. of Commerce 1998c). Likewise, although rural areas cover 88.3 percent of Idaho, these areas are home to 36.2 percent of the state's population. Nearly two-thirds of Idaho's residents live on 11.8 percent of the state's land (Idaho Dept. of Commerce 1999).

Most of Idaho's growth between 1990 and 1998 came as residents of other states moved to Idaho (U.S. Bureau of the Census 1998). Over this time period, the Idaho Department of Transportation tracked net surrenders of drivers' licenses, noting the state of origin or destination when incoming drivers apply for an Idaho license, or conversely, the state the license is surrendered to when Idaho drivers move out-of-state. These data show that more drivers have come into Idaho than have left. The data also show that most of these drivers have come from California (58 percent of the net eight-year growth), followed by Washington (7.62 percent), Oregon (6.69 percent), and Montana (5.07 percent).

There has also been movement *between* parts of Idaho. Although the state has no database tracking the movement of people from county to county, the movement of passenger vehicles (vans, cars, and pickups) provide some general indications.[2] Data show that over the last six years (1993-1998), 7 of the 44 counties in Idaho have shown net increases in vehicles registered from other counties. The top three of these counties include Canyon (net increase of 2,996), Ada (1,863), and Kootenai (897). Canyon and Ada Counties include the capital city of Boise and surrounding communities, while Kootenai County includes the city of Coeur d'Alene, which lies about 30 miles east of Spokane, Washington (Idaho Dept. of Transportation 1998).

In the decade ending April 2000, Idaho growth over the period was not evenly spread. Leading counties included Boise (90.0 percent), Teton (74 percent), Kootenai (56 percent), Ada and Canyon (46 percent) and Blaine (40 percent). At the other end are two counties that saw population declines: Butte and Shoshone (-1 percent each). (Robison and Gneiting 2002).

Between 1987 and 1997, the state changed in other ways. Retail and wholesale trade, tourism, electronics, health services, and information-oriented services are among the growth sectors (Idaho Dept. of Commerce 1998a). Non-farm employment increased by 52.5 percent, the third-fastest rate in the U.S., with an increase in high-tech employment of 82 percent. Total personal income grew by 105 percent, and per-capita income by 66 percent. Construction value increased by 322 percent (Idaho Dept. of Commerce 1998b).

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[2] The database does not, however, account for those that live primarily in one county, but who, for a variety of reasons, register their vehicles in another.

At the same time, traditional resource-based industries of agriculture, forest products, and mining remain major economic segments. In 1994, Idaho ranked first in the nation in the production of potatoes, winter peas, lentils, and trout. However, the number of Idaho farms declined from 1987 to 1992, while the average farm size increased (Idaho Dept. of Commerce 1998c).

A total of 21 companies have corporate headquarters in Idaho, including Micron Technology, Boise Corporation (formerly Boise Cascade Corporation), the Washington Group (formerly Morrison-Knudsen), J. R. Simplot Company, Albertsons, Potlatch, and Hecla Mining. Many, but not all, of these are located in Boise.

Several Idaho companies have become important international exporters. The state itself has also developed a heightened presence overseas, with offices in Taiwan, South Korea, Japan, and Mexico. In 1994, the U.S. Department of Commerce ranked Idaho as the number one State in terms of the rate of increase in exports (Idaho Dept. of Commerce 1998a).

Along with other changes, Idaho is becoming racially more diverse. Although Hispanics now comprise 7.9 percent of the state's population in 2000, as compared to 5.3 percent in 1990, the state's population remains largely white and Anglo-Saxon (Quintana 2001). Canyon County in southwestern Idaho includes 25 percent of the state's Hispanic population (Idaho Dept. of Commerce, 1998c). Although there are few data available, there is a sense that Idaho Hispanics use and relate to national forests in ways similar to the state's predominantly white population (Ramirez 1999).

Natural Resource Issues in Idaho - Idaho's recent population growth and economic changes have often been linked in part to the state's natural setting and recreational opportunities. The State Department of Commerce markets Idaho's quality of life—linked to broad recreational opportunities, comfortable four-seasons climate, and clean air and water—when recruiting businesses and residents (Idaho Dept. of Commerce 1999).

Natural resource issues consistently rank at or near the top of Idaho residents' concerns:

- A 2001 opinion poll was conducted for the Idaho Forest Products Commission and the Idaho Rangeland Resource Commission (Idaho Forest Products Commission/Idaho Rangeland Resource Commission 2001). When 416 residents were asked to identify the number one challenge facing Idaho today, respondents most often cited "water issues/not enough/drought," and "education." When a different set of 422 residents were asked to identify the most important environmental issue facing Idaho, "water control/water use/keeping control of water/water shortage" received the most responses.

  In this same poll, 57 percent of the 816 respondents felt that Idaho's public forests, both federal and state, were "somewhat healthy," while 18 percent perceived them as "healthy." A total of 53 percent "definitely" believe Idaho public forests benefit more from forest management than lack of management, while 32 percent believe this is "probably" true. ("Management" was not defined in the survey question.) In addition, 42 percent believe the general condition of Idaho's rangeland is "fair," while 41 percent believe it is "good."

- In an August 2000 survey of 813 Idaho residents, “environment” garnered the most votes from residents asked to identify the biggest or most important issue facing Idaho today (Quintana and Hahn 2000).

- A similar survey in 1998 found that many wanted to see the state’s federal lands open to traditional industries of forestry, agriculture, and mining. In the 1998 survey, about 47 percent believed there was too much emphasis on recreation, while 28 percent believed there was too much emphasis on logging, mining, and grazing (Barker 1998).

- The 12th Annual Idaho Public Policy Survey, released in February 2001, noted that 62.8 percent of the 706 respondents opposed then President Clinton’s roadless initiative, while 30.8 percent supported it (Gonzalez and Watts 2001). The 1998 Idaho Public Policy Survey, undertaken by Boise State University, found similar results. Over 75 percent of the 653 interviewees believed that timber harvesting was an appropriate use of Idaho National Forests, while 80 percent felt that livestock grazing was an appropriate use of National Forest and BLM lands in the state. About 78 percent stated there was enough Congressionally designated Wilderness (Scudder et al. 1998).

- The 1986 Governor's Task Force on Idahoans Outdoors found that “preserving access to public lands for recreation use” was rated by over 85 percent of the respondents as an outdoor recreation issue of great importance (Idaho Dept. of Commerce 1998c).

Access to public lands has emerged as a contentious and challenging issue in Idaho and other western states. For many people, access relates to recreational use, especially use of all-terrain vehicles (ATVs), trail bikes, and other motorized vehicles on roads, trails, and off-road areas. (More information on recreational access is provided in the Recreation section found earlier in this chapter.) But the access issue also involves other human values and beliefs. For example, one comment on the Draft EIS for the Forest Plans questions how reducing access to the Forest would provide for overall human needs, while another called Forests to be available for general public use. Others cite a concern about access for elderly and disabled citizens. By contrast, another commenter expressed his belief that motorized access provides noise and interruption, and that some areas need to be protected for future generations.

Wildfire and its effects on human communities have also emerged as key issues. After the severe and widespread western wildfires in the summer of 2000, then-President Clinton directed the Secretaries of Agriculture and Interior to develop a plan to respond to severe wildland fires, reduce their impacts on rural communities, and ensure sufficient firefighting capacity in the future. This “National Fire Plan” includes a comprehensive, long-term strategy for ecosystem protection, hazardous fuels reduction, and wildfire recovery, in cooperation with States and communities. As part of this approach, the Western Governors’ Association developed a 10-year strategy entitled, “A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment,” which calls for more active collaboration between fire management organizations and communities. In August 2001, a list of urban-wildland interface communities within the vicinity of federal lands that are at high risk from wildfire was published in the

Federal Register. This list, developed by the State of Idaho, includes nearly every community in the state, including the 19 communities examined later in this section. (Federal Register Vol. 66, No. 160, 2001) Refinement of this list is currently ongoing. Further discussion on the urban-wildland interface is found in the Fire Management section earlier in this chapter.

The Western Governors' Association (WGA) is an independent, non-partisan organization of governors from 18 western states, including Idaho. In June 1999, the WGA adopted a policy resolution committing "to a new doctrine to guide natural resource and environmental policy development and decisionmaking in the West" (WGA 1999a). Known as "Enlibra," a newly created word symbolizing balance and stewardship, this policy resolution called for the "use of collaborative processes to break down barriers and find solutions" (WGA 1999b). In March 2001, the Council of State Governments-West (CSG-West), Western Interstate Region of the National Association of Counties, and the Western Municipal Conference adopted a joint policy resolution fostering the appropriate use of collaborative problem solving (CSG-West 2001). The mission of the CSG-West is to provide a platform for regional cooperation and collaboration among western state legislators (CSG-West 2000).

Counties

Introduction - The Ecogroup socio-economic overview area includes 17 counties within and adjacent to the Boise, Payette, and Sawtooth National Forests. The relationship between counties and the Forest Service is an important one, in part because of economic benefits that the counties receive directly from federal land managers. The 17 counties are Ada, Adams, Blaine, Boise, Camas, Canyon, Cassia, Custer, Elmore, Gem, Gooding, Idaho, Lincoln, Power, Twin Falls, Valley, and Washington. These counties were selected because they include national forest land, and/or have major social and/or economic ties to the Ecogroup National Forests. Ada, Canyon, and Twin Falls Counties contain little or no National Forest land and few direct economic ties to the Southwest Idaho Forests. However, Ada and Canyon Counties encompass the capital city of Boise and the burgeoning "Treasure Valley corridor," and Twin Falls County includes the growing city of Twin Falls. Because of their increasing population and proximity to the National Forests, these counties have important social and recreational ties to the Forests.

In-depth economic profiles were developed for 14 of these 17 counties (all except Ada, Canyon, and Twin Falls) that contain communities with the potential to be significantly affected, from an economic perspective, by the Ecogroup Forest Plan revision.

Population - Population information is summarized from the 1999 *Affected Economic Environment and Baseline for the No-Action Alternative*, developed by Economic Modeling Specialists, Inc. (Robison and Gneiting 1999) for the Ecogroup Forest Plan revision process updated in 2002. This document is available in the planning record.

Table SO-3 lists historic population estimates (1970 to 2000) for the 17 counties, along with the median of two sets of population projections (from now until the year 2020). Historic population estimates are derived from the U.S. Department of Commerce, Regional Economic Information System. In developing the median population projection, the first set of projections was established by the ICBEMP, which assumed that jobs follow population (and populations are attracted according to the level of natural amenities). The second set of projections was developed by Idaho Power, a standard source for population and economic projections in Idaho (Robison and Gneiting 1999). The Idaho Power projections are assembled using the traditional assumption: population follows jobs, and jobs follow economic opportunity (Robison and Gneiting 1999).

Percentage of Federal Land - Table SO-4 illustrates the percentage of federal land included in each county. In 10 of the 17 counties, more than 50 percent of the land is owned by the federal government. Seven of the 17 counties (Blaine, Boise, Custer, Elmore, Idaho, Lincoln, and Valley) have 70 percent or more of the land in federal ownership. By contrast, Canyon County has the smallest percentage of federal land—8 percent of the county's land base.

Table SO-3. Historic and Projected Populations of Counties in the Ecogroup Area: 1985-2020

County	1985	1990	1995	2000	2010	2020	1990-2000 Change	2000-10 Projected Change	2010-20 Projected Change
Ada	189,811	207,505	252,251	300,904	358,495	416,167	45%	19%	16%
Adams	3,372	3,265	3,850	3,476	3,973	4,449	6%	14%	12%
Blaine	12,159	13,767	16,528	18,991	23,337	27,543	38%	23%	18%
Boise	3,285	3,552	4,669	6,670	7,902	8,971	88%	18%	14%
Camas	795	737	831	991	1,212	1,422	34%	22%	17%
Canyon	87,815	90,639	109,123	131,441	155,288	178,676	45%	18%	15%
Cassia	20,315	19,607	21,187	21,416	25,025	28,703	9%	17%	15%
Custer	5,118	4,155	4,255	4,342	5,325	6,294	5%	23%	18%
Elmore	21,764	21,232	23,547	29,130	34,504	40,284	37%	18%	17%
Gem	11,789	11,940	13,871	15,181	17,267	19,246	27%	14%	11%
Gooding	12,246	11,664	12,908	14,155	16,305	18,289	21%	15%	12%
Idaho	14,386	13,818	14,860	15,511	17,082	18,777	12%	10%	10%
Lincoln	3,508	3,345	3,716	4,044	4,660	5,230	21%	15%	12%
Power	7,233	7,073	8,129	7,538	8,678	9,823	7%	15%	13%
Twin Falls	54,185	53,797	59,383	64,284	71,543	78,748	19%	11%	10%
Valley	6,525	6,150	7,848	7,651	9,621	11,426	24%	26%	19%
Washington	8,662	8,595	9,606	9,977	11,280	12,504	16%	13%	11%
State of Idaho	977,617	996,553	1,149,284	1,293,953	1,506,581	1,717,847	23%	16%	14%

"Historic" population figures (1985, 1990, 1995 and 2000) are from the U.S. Department of Commerce, Regional Information System. (Robison and Gneiting 1999 and 2002).

"Projected" population figures (2010, 2020) represent the median of projections compiled by Idaho Power and by ICBEMP. (Robison and Gneiting 1999 and 2002)

Table SO-4. Acres and Percent of Landownership by County

County	Unit of Measure	Federal Land Ownership			Other Land Ownership			Total
		BLM	National Forest	Other Federal	State	Private	City & County	
Ada	Acres	192,093	3,611	109,769	45,831	316,133	7,763	675,200
	Percent	45.2			6.9	46.8	1.1	100.0
Adams	Acres	54,295	511,042	3,040	37,249	265,542	2,240	873,408
	Percent	65.1			4.2	30.4	0.3	100.0
Blaine	Acres	796,272	491,115	21,013	60,322	319,014	5,000	1,692,736
	Percent	77.3			3.6	18.8	0.3	100.0
Boise	Acres	31,744	873,345	30,475	86,393	194,676	967	1,217,600
	Percent	76.8			7.1	16.0	0.1	100.0
Camas	Acres	120,490	323,546	143	25,075	216,419	2,327	688,000
	Percent	64.6			3.6	31.5	0.3	100.0
Canyon	Acres	9,846	20.201	0	3,463	350,834	850	385,194
	Percent	8.0			0.9	90.9	0.2	100.0
Cassia	Acres	516,356	387,475	19,762	51,590	665,045	2,396	1,642,624
	Percent	56.2			3.1	40.6	0.1	100.0
Custer	Acres	813,041	2,123,657	27	53,805	159,549	2,305	3,152,384
	Percent	93.2			1.7	5.0	0.1	100.0
Elmore	Acres	530,313	783,196	108,799	124,338	423,104	42	1,969,792
	Percent	72.2			6.3	21.5	0.0	100.0
Gem	Acres	72,093	60,968	2,439	20,366	202,293	1,905	360,064
	Percent	37.6			5.7	56.2	0.5	100.0
Gooding	Acres	244,008	0	397	20,034	202,426	847	467,712
	Percent	52.3			4.2	43.3	0.2	100.0
Idaho	Acres	93,319	4,429,429	1,519	75,817	825,210	5,234	5,430,528
	Percent	83,3			1.4	15.2	0.1	100.0
Lincoln	Acres	574,669	0	1,634	22,875	172,259	147	771,584
	Percent	74.7			3.0	22.3	0.0	100.0
Power	Acres	228,527	36,047	11,242	26,688	593,909	3,235	899,648
	Percent	30.7			3.0	66.0	0.4	100.0
Twin Falls	Acres	545,467	92,655	3,840	30,077	566,793	3,232	1,232,064
	Percent	52.1			2.4	45.2	0.3	100.0
Valley	Acres	5,093	2,029,724	38,708	75,342	202,993	2,188	2,354,048
	Percent	88.1			3.2	8.6	0.1	100.0
Washington	Acres	220,337	123,753	1,576	75,353	507,962	3,015	932,096
	Percent	37.1			8.1	54.5	0.3	100.0

Source: Acreage and percentage figures are from "County Profiles of Idaho, 1996," published by the Idaho Department of Commerce.

Direct Payments from Federal Land Managers - The relationship between counties and the Forest Service is an important one, in part because of economic benefits that the counties receive directly from federal land managers. These direct benefits are linked to two specific funds:

The Secure Rural Schools and Community Self-Determination Act of 2000 - The Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393) was signed into law on October 30, 2000. This law was enacted "to restore stability and predictability to the annual payments made to States and counties containing National Forest System lands and public domain lands managed by the Bureau of Land Management for use by the counties for the benefit of public schools, roads and other purposes for fiscal year (FY) 2001 through 2006 (October 1 – September 30).

Before Public Law 106-393 was enacted, the Forest Service returned 25 percent of revenues from the sale of forest products and permitted operations to counties which contain National Forest System land, through the "25 Percent Fund Law of 1908." The amount that a county received from each National Forest's 25 percent fund was proportional to the percent of the Forest located in that county. State regulations stipulated that 70 percent of the funds were to be used for public roads, with 30 percent used to fund public schools.

In a given year,[3] most of the Forest Service revenue produced by the Ecogroup Forests came from the Boise and Payette. The revenue generated by these two Forests typically came from the sale of timber (both green and salvage), with lesser amounts generated by permits for livestock grazing, ski areas, recreation cabins, and other uses. On the Sawtooth NF, lesser revenue was generated, and most of it came from permits provided for ski areas, recreation cabins and other recreation special uses, and livestock grazing (USDA Forest Service 1997). Because of these relationships, there was a traditional and strong link between the revenues generated by the Ecogroup Forests (particularly the timber receipts associated with the Boise and Payette NFs), and the amount of revenue provided to the counties from the 25 Percent Fund each year.

Under Public Law 106-393, counties will have the option of continuing to receive payments under the 25 Percent Fund Act, or electing to receive their share of the average of the three highest 25 percent payments made to the State during the period of FY 1986 through FY 1989 (the "full payment amount").

The Act requires that a county that chooses to receive its share of the full payment amount must spend between 80 and 85 percent of the funds in the same way as the 25 percent funds (i.e., in Idaho, the percentages allocated for public roads vs. schools). The remainder of the money must be either allocated to "Title II" projects (Special Projects on Federal Lands), "Title III" projects (County Projects), or returned to the U.S. Treasury.

Table SO-5 shows the 25 percent fund payments from the Boise, Payette and Sawtooth NFs to the 17 counties over the last several years, as compared to each county's share of the full payment amount. The table indicates that the level of 25 percent fund decreased in the last several years, as linked to the decrease in National Forest timber sales on the three Forests, and that for most counties, their share of the full payment amount would be substantially greater than that received in the past few years.

Payments in Lieu of Taxes - Counties also receive payments from the Federal Government based

[3] For this example, the year 1997 was used, because it was the most current year for which data was available at the time this report was written.

on the Payments in Lieu of Taxes (PILT) Act of 1976. PILT is a federal revenue-sharing program designed to compensate local governments for the presence of tax-exempt federal lands within their jurisdiction. PILT payments are *not* linked to revenues generated by the sale of National Forest products or permitted activities.

The Act authorizes payments under one of two alternatives, based on the acres of qualifying federally managed acres ("entitlement acres") within the county, subject to a payment ceiling based on county population. The amount paid to the county is the higher of two alternative calculations. However, PILT payments are appropriated each year by Congress, and actual payments may be less than those calculated.

Table SO-6 shows recent PILT payments for counties within the Ecogroup assessment area. PILT payments decreased substantially in FY 1995 as compared to FY 1980, but increased in FY 2000. In some counties, the FY 95 decreases were compounded by similar decreases in 25 percent fund payments (Tables SO-5, SO-6).

Natural Resource Issues in Ecogroup Counties - In assessing natural resource issues in the Ecogroup area, local county commissioners were interviewed to gain a more direct sense of the changes facing local governments and communities. Through these interviews, it became clear that public-land and natural resource issues remain at the forefront, largely because the counties contain substantial amounts of public land, with the resources and challenges that these lands bring. While each county has unique issues and situations, many share concerns and challenges related to loss of traditional industries, recreational changes, area growth, and tension between local and national authorities and decision-making.

Most of the counties in the Ecogroup area have been or are dependent on industries that utilize public-land resources such as timber, livestock grazing, or mining. Some of the commissioners interviewed are extremely concerned about the decline in these traditional industries, the difficulty of replacing jobs associated with these industries, and the uncertainty of the future. Leon Newman, recent Adams County Commissioner, spoke of the dilemma, noting that it had been difficult to entice business due to the lack of infrastructure within the county, and the jobs that have come to the county have been primarily low paying without benefits (Newman 1998).

Others cited the spin-off effects of declining payments from the federal government, particularly the 25 percent fund.[4] Camas County Commissioner Matt McLam noted that the 25 percent fund financed $30,000 of the road and bridge fund in 1998, as compared to $60,000 three years earlier. He noted that the portion of the 25 percent fund allocated for school operation and maintenance declined from $25,000 to $13,000 in the same 3 years. Phil Davis, commissioner for Valley County, commented that, on average, receipt funds are equal to all of the property taxes received by the county. He also noted that if the 25 percent fund declines, property taxes would need to be raised, which would be difficult, given anticipated public response, as well as Idaho's three percent cap on annual property tax increases. However, Davis also anticipated

[4] As noted above, the interviews were conducted in the fall of 1998, before passage of the Secure Rural Schools legislation. As shown in Table SO-6, the new law should provide a substantial increase in the county payments.

that if property taxes were raised, much of the agricultural land would be subdivided, and agricultural culture would be lost (Davis 1998). Only in Ada County, with a large, diversified economy and a small amount of National Forest land, was the role of the 25 percent fund considered not significant in terms of county revenue (Bisterfeldt 1998).

Table SO-5. Twenty-Five Percent Fund Payment to Counties

County	Payment From:	FY 1985	FY 1990	FY 1995	FY 2000	FY 1995 – 2000 Change	County Share – Full Payment
Ada	Boise NF	1,575	2,228	3,199	1,785	-44%	5,900
Adams	Payette NF	216,195	502,006	554,642	121,844	-78%	737,600
Blaine	Sawtooth NF	72,766	55,575	81,734	57,071	-30%	96,200
Boise	Boise NF	326,165	461,663	773,627	415,685	-46%	1,354,700
Camas	Sawtooth NF	48,063	36,878	54,113	37,785	-30%	63,700
Canyon*		0	0	0	0	0%	0
Cassia	Sawtooth NF	58,685	44,370	64,734	45,202	-30%	76,400
Custer	Sawtooth NF	36,994	28,331	41,735	29,142	-30%	179,000
Elmore	Boise NF Sawtooth NF TOTAL	237,720 21,767 259,487	337,373 16,614 353,987	564,660 24,378 589,038	309,284 29,142 338,426	-42%	1,023,000
Gem	Boise NF	22,587	32,311	54,007	29,219	-46%	94,800
Gooding*		0	0	0	0	0%	0
Idaho	Payette NF	346,680	789,950	872,946	192,976	-78%	4,863,900
Lincoln	Sawtooth NF	0	0	0	0	0%	0
Power	Sawtooth NF	N/A	3,392	4,976	3,475	-30%	7,500
Twin Falls	Sawtooth NF	13,845	10,561	15,497	10,821	-30%	18,200
Valley	Boise NF Payette NF TOTAL	400,553 383,530 784,083	567,790 869,126 1,436,916	951,301 959,624 1,910,925	515,217 213,548 728,765	-62%	2,970,000
Washington	Boise NF Payette NF TOTAL	30 55,354 55,384	41 121,406 121,447	69 134,230 134,299	38 29,457 29,495	-78%	179,000
TOTAL		**2,242,509**	**3,879,615**	**5,155,472**	**2,041,691**		**11,669,900**

Notes: Data reflects only 25 percent payments from Boise, Payette and Sawtooth NFs; some counties may also receive 25 percent fund payments from other National Forests. FY extends from Oct. 1 to Sept. 30 of each calendar year.

The ICBEMP SDEIS reported selected demographic and socioeconomic information for Interior Columbia Basin counties. This information included the percentage of each county's budget (in the early 1990s) derived from federal revenue-sharing payments (including the 25 Percent Fund and PILT), based on BLM- and/or Forest Service-administered lands. For the SWIEG counties, these budget percentages include Ada, 0.3 percent; Adams, 29 percent; Blaine, 5.7 percent; Boise, 36 percent; Camas, 12 percent; Canyon, 0.1 percent; Cassia, 6 percent; Custer, 21 percent; Elmore, 35.6 percent; Gem, 4 percent; Gooding, 4.2 percent; Idaho, 44.4 percent; Lincoln, 8 percent; Power – not reported; Twin Falls, not available in the SDEIS report; Valley, 38.7 percent; Washington, 6 percent.

Sources:
- For 1985 data, "Payments to States from National Forest Receipts; FY 1985: County Summary (12/13/85).
- For 1990 data, "Estimated Payments to States to be Paid in Calendar Year 1990 Based on FY 1990 Estimated National Forest Receipts Oct. 1, 1989 thru Sep. 30, 1990: County Summary" (6/12/90).
- For 1995 data, "Payments to States from National Forest Receipts; FY 1995: County Summary" (12/18/95).
- ***1980, 1985, 1990 and 1995 data have been adjusted to reflect 2000 dollars***. These data appeared previously in Table 3-16 of the "Preliminary Analysis of the Management Situation: Summary" for the Southwest Idaho Ecogroup Forest Plan Revision, issued in November 1997, and included in the planning record. In Table 3-16, these data were adjusted to reflect 1995 dollars. In the DEIS, the 1980, 1985, 1990 and 1995 data were adjusted to reflect 1999 dollars. For this FEIS table, these figures were re-adjusted to reflect 2000 dollars by multiplying by 1.02 (Iverson, 2001).
- "County share of full payment" as provided by Washington Office, Forest Service, in undated table; April 2001.

*No payments made; county does not contain any Boise, Payette, or Sawtooth NF land.

Table SO-6. Payments in Lieu of Taxes (PILT)

County	Entitlement Acres (acres in 1995)	FY 1980	FY 1995	FY 2000	FY 95-00 Change
Ada	199,368	228,181	155,748	155,073	< - 1%
Adams	545,749	105,450	55,039	75,572	37%
Blaine	1,296,837	612,004	429,633	507,692	18%
Boise	890,101	143,132	89,767	131,080	46%
Camas	442,675	79,144	39,340	44,533	13%
Canyon	20,528	N/A	16,005	16,152	< 1%
Cassia	920,936	1,018,261	569,039	602,261	6%
Custer	2,935,162	337,285	210,978	216,188	2%
Elmore	1,292,889	1,135,204	595,145	68,614	15%
Gem	134,324	117,247	13,547	96,685	614%
Gooding	231,382	377,883	180,832	187,618	4%
Idaho	4,516,122	837,070	452,987	476,658	5%
Lincoln	575,154	332,444	178,443	199,607	12%
Power	288,437	397,326	225,282	228,262	1%
Twin Falls	641,338	935,604	501,197	505,168	< 1%
Valley	2,045,758	392,813	206,315	215,892	5%
Washington	326,358	351,490	191,511	231,016	21%
TOTAL	17,303,118	7,400,538	4,110,808	3,958,071	

"FY" extends from October 1 to September 30 of each year.
"N/A" = data not readily available.

The ICBEMP SDEIS reported selected demographic and socioeconomic information for Interior Columbia Basin counties. This information included the percentage of each county's budget (in the early 1990s) derived from federal revenue-sharing payments (including the 25 Percent Fund and PILT), based on BLM- and/or Forest Service-administered lands. For the SWIEG counties, these budget percentages include Ada, 0.3 percent; Adams, 29 percent; Blaine, 5.7 percent; Boise, 36 percent; Camas, 12 percent; Canyon, 0.1 percent; Cassia, 6 percent; Custer, 21 percent; Elmore, 35.6 percent; Gem, 4 percent; Gooding, 4.2 percent; Idaho, 44.4 percent; Lincoln, 8 percent; Power – not reported; Twin Falls, not available in the SDEIS report; Valley, 38.7 percent; Washington, 6 percent.

Sources:

- "Entitlement Acres" from *Idaho Public Lands: Facts and Figures 1996*, published by the Idaho Association of Counties. Figures may differ slightly from those shown in Table IV-3, "Land Ownership by County," due to number rounding and other factors.

- ***1980 and 1995 data have been adjusted to reflect 2000 dollars***. These data appeared previously in Table 3-17 of the "Preliminary Analysis of the Management Situation: Summary" for the Southwest Idaho Ecogroup Forest Plan Revision, issued in November 1997, and included in the planning record. In Table 3-17, these data were adjusted to reflect 1995 dollars. In the DEIS, the 1980 and 1995 data were adjusted to reflect 1999 dollars. For the FEIS, these figures were re-adjusted to reflect 2000 dollars by multiplying by 1.02 (Iverson 2001).

Many counties have seen a dramatic increase in recreation, but have noted only a small (if any) increase in the number of recreation-related jobs (Newman 1998, Dyer 1998, McLam 1998). Others note that, while recreation increases have provided more jobs, these increases ". . . have also provided pressures on the county to provide more services in law enforcement, emergency services, and more pressure on how the public lands are used and by whom" (Baker et al. 1998). Ada County has found that increased use in the Boise Foothills has required greater coordination among agencies for fire protection, law enforcement, and other activities (Bisterfeldt 1998). By contrast, Blaine County, which includes the Sun Valley resort complex, has and continues to be a recreation-based area. The recreation presence in Blaine County has increased, as evidenced by the growing number of recreation shops and expansion of trails (Harlig 1998).

Many of the commissioners discussed a change they sense in how community economies and decision-making works, citing a shift from small- to larger-scale economies, as well as local to national influence and decision-making. This change includes but extends beyond the National Forests to include other natural resource and socio-economic issues. For example, several commissioners feel that local managers have less authority and management discretion than they have had in the past, and that decisions are now made or strongly influenced by upper levels of the Forest Service, and/or regulatory agencies, environmental groups, and the courts (Dyer 1998, Newman 1998, Adams and Adams 1998, Davis, 1998). In a similar vein, some see a shift in the size of agricultural operations, with farms or producing/processing plants owned by fewer people, encompassing larger acreages or capacities (McLam 1998, Adams and Adams 1998). Likewise, in Blaine County, differences in the community were felt when Sun Valley, once owned by an individual, was purchased by a large oil company (Harlig 1998).

Some commissioners believe the strengths of their counties and communities include their smallness, and an ability to "pull together" to help each other (Baker et al. 1998, McLam 1998). However, many have also found a shift in this camaraderie, noting "you no longer know everyone and no longer wave to people on the street" (Davis 1998). Others find that "we no longer have the time to socialize with our friends and neighbors like we would like to. Our time is spent going to meetings trying to figure out how we are doing to deal with another regulation, designation, or restriction on us" (Baker et al. 1998). In more general terms, some believe there is "…less free exchange of ideas between parties, and the communication is becoming more lawyer vs. neighbor and vs. community, and less between neighbors and within the community. People have stopped talking with each other and have started talking at each other" (Harlig 1998).

Nearly all of the county commissioners spoke specifically of growth. In Ada County, the numbers and diversity of people has grown, and the growth includes "native influx"--those that had left the Treasure Valley but now are returning. With this growth has come an increase in recreation desires, as reflected in a desire for more parks and open space (Bisterfeldt 1998). In other areas, such as Adams or Cassia County, newcomers include retirees, seeking a more rural lifestyle (Newman 1998, Adams and Adams 1998). Others see themselves as "bedroom communities" for Wood River Valley (Ketchum/Sun Valley, etc.) workers seeking affordable housing (McLam 1998). Growth in Blaine County has meant a decrease in population diversity, with lower income class residents and "town characters" driven out by county ordinances and rising property values (Harlig 1998).

Despite the changes and challenges that county leaders face, many retain a sense of pride in their counties and surroundings, and a desire to retain viable communities for the future. Many cite the "natural beauty" of their area, as well as the wildlife and recreational opportunities (McLam 1998, Harlig 1998, Dyer 1998), or the historic traditions (Adams and Adams 1998, Davis 1998). Many express a desire to continue a "multiple-use" way of life, while recognizing that economic diversity and economic development are necessary (Adams and Adams 1998).

Communities

Introduction - This assessment includes more in-depth examination of local communities than the original assessments, in part because there is much public and internal concern about how changes in National Forest management could affect rural communities. In addition, there is growing recognition that the community, defined in a place-specific sense, is the basic unit of social analysis (Committee of Scientists Report 1999).

In developing the previous Forest Plans for the Boise, Payette, and Sawtooth Forests, analysts addressed job and income effects with a county-level assessment. If a county contained a job conceivably touched by National Forest management, the county was deemed part of the Forest's Zone of Influence, or ZOI. Impacts were estimated for ZOI counties, and reported against a backdrop of countywide jobs (Robison and Gneiting 1999).

This approach had two notable shortcomings. First, it devoted considerable analytic resources to the estimation and report of impacts where they were of little public concern; namely, larger urban areas where the job and income effects of National Forest management are relatively minuscule. And second, and more importantly, it masked potentially acute impacts in the smaller rural communities where public concerns were high by reporting these against a broad county and multi-county backdrop (Robison and Gneiting 1999). In other words, communities within a county differ in size, social fabric, and economic base, and combining and representing them as a county masks the impacts on individual communities.

The current effort overcomes these shortcomings by adopting a community rather than county level focus. Similarly, the analysis of effects in the "Environmental Consequences" chapter of the EIS prepared for the Forest Plan revision will be confined to communities that may be significantly impacted by Forest planning alternatives (Robison and Gneiting 1999).

The Ecogroup socio-economic overview area encompasses 29 communities within and adjacent to the Boise, Payette, and Sawtooth Forests. Of the 29 communities, 19 were selected for inclusion in this overview, because they represent a variety of social and economic relationships that southern Idaho communities have with the local National Forests. The 19 communities are Cascade, Challis, Council, Crouch/Garden Valley, Emmett, Fairfield, Gooding, Hailey/Bellevue, Idaho City, Ketchum/Sun Valley, McCall/Donnelly, New Meadows, Oakley Valley (Oakley), Raft River Valley (Almo-Malta-Elba), Riggins, Stanley, Treasure Valley (including but not limited to Boise, Eagle, Meridian, Kuna, Nampa and Caldwell), Twin Falls and Weiser. These communities are displayed in Figure SO-1, included earlier in this chapter.

Overview - In general, information for the community profiles was derived from these sources:

- Economic Modeling Specialists, Inc. (EMSI) economic profiles of selected communities throughout the Ecogroup, prepared in 1999 and updated for 2000. The EMSI report also presents economic perspectives at the national, regional (ICBEMP), and state scales. The EMSI report is included in the planning record (*Affected Environment and Baseline for the No Action Alternative*).

- Interviews of local elected officials (county commissioners and mayors) conducted by public-administration graduate students at Boise State University in the fall of 1998. The planning record includes a description of the process used to prepare and conduct these interviews.

- Community self-assessment and profiles developed in 1996 by Dr. Chuck Harris, University of Idaho, as part of *Rural Communities in the Inland West: An Assessment of Small Communities in the Interior and Upper Columbia River Basins*. The planning record includes a description of the methodology used to conduct this study.

- Community profiles developed by the Idaho Department of Commerce.

- *Idaho Place Names: A Geographical Dictionary,* by Lalia Boone, published in 1988 by the University of Idaho Press.

- Professional knowledge of Forest Service employees who live and work in or adjacent to the affected communities.

For the purposes of economic impact analysis, regional scientists and economic geographers prescribe a community region model (sometimes called a 'city region" model). The community region model recognizes that economic activity tends to spatially organize in the fashion of a trade hierarchy. An economically dominant center (the downtown or otherwise most commercially built-up area) hosts the bulk of the region's goods and services. A surrounding area of homesteads, neighborhoods, and suburbs relies on the goods and services of the center, and the center relies in varying degrees on the surrounding area for its workforce. The operative principle is that the region as a whole (i.e., the larger community region) exhibits a measure of economic cohesion, and otherwise functions as a distinct and semi-independent economy (Robison and Gneiting 1999).

For each community, an economic profile was developed for 2000, the most recent year for which relatively current data are available. Each community's economic profile provides a snapshot of jobs and income, and the labor income and jobs information provides industry detail to roughly the Standard Industrial Classification (SIC) 2-digit level. Summaries of the economic profiles are included as part of the 14 community profiles, and the complete economic profiles are included in the EMSI report, included in the planning record. Baseline projections were also developed for the years 2005 and 2010, respectively.

Table SO-7 shows population changes in these communities for the period 1980-2000. Nearly all of these communities grew at least slightly during this time. For some of these communities, growth was substantial.

Table SO-7. Community Populations: 1980 - 2000

County	Community	1980	1990	2000	1990-2000 Change
Ada/Canyon	Treasure Valley[5]	167,033	199,710	333,601	67%
Adams	Council	917	831	816	-2%
	New Meadows	576	534	533	< -1%
Blaine	Hailey-Bellevue	3,125	4,850	8,076	67%
	Ketchum-Sun Valley	2,745	3,461	4,430	28%
Boise	Crouch	69	75	154	105%
	Idaho City	300	322	458	42%
Camas	Fairfield	404	371	395	7%
Cassia	Oakley Valley[2]	N/A	635	668	5%
	Raft River Valley[3]	N/A	N/A	177	N/A
Custer	Challis	758	1,073	909	-15%
	Stanley	99	71	100	41%
Gem	Emmett	4,605	4,601	5,490	19%
Gooding	Gooding	N/A	2,820	3,384	20%
Idaho	Riggins	N/A	443	410	-7%
Twin Falls	Twin Falls	41,807	27,634	34,469	25%
Valley	Cascade	945	877	997	14%
	McCall-Donnelly	2,327	2,140	2,222	2%
Washington	Weiser	N/A	4,571	5,343	17%

Source: For 1980 and 1990 data for Idaho, "County Profiles of Idaho, 1996" (Idaho Department of Commerce 1996). For 1980 data for the Treasure Valley (see footnote below), source was telephone conversation with Alan Porter, Idaho Department of Commerce; May 9, 2001.

[1] For the purposes of this discussion, the "Treasure Valley" includes the incorporated communities in Ada County (Boise, Eagle, Garden City, Kuna, Meridian and Star) and Canyon County (Caldwell, Greenleaf, Melba, Middleton, Nampa, Notus, Parma, Wilder).
[2] Includes the community of Oakley and surrounding residents.
[3] Includes the communities of Almo, Elba and Malta. However, the population displayed is for Malta – the only community of the three for which population data is available.

Community Profiles - Each of the 19 communities is profiled by briefly describing the community's origin, demographics and economic base. The "community character" is also depicted, as derived from its self-assessment carried out as part of the 1996 Harris study, and interviews with county and community leaders conducted in 1998, as applicable.[6] Professional knowledge of Forest Service employees who live in and adjacent to the communities was also used to describe community character.

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[6]Among the 194 communities included in the 1996 Harris community self-assessment, 13 of them lie in the Ecogroup area. These communities include Bellevue, Cascade, Challis, Donnelly, Emmett, Hailey, Idaho City, Ketchum, New Meadows, Riggins, Shoshone, Stanley, and Weiser. In the 1998 county commissioner/mayor interviews, county commissioners from Valley, Boise, Camas, Ada, Blaine, Cassia, Adams, and Custer counties were interviewed, along with mayors from Ketchum and Fairfield. Summaries of the Harris community self-assessment and county commissioner/mayor interviews are included in the planning record.

In general, each community profile is organized to briefly describe:

- The community's location and major access routes;
- Its origin and the source of its name;
- Major services and employers;
- Its community self-assessment;
- The community's economic profile; and
- Observations of local county commissioners and/or mayors.

Community economic profiles and projections appear with three sub-tables. The first table shows what is termed the "Community Income Account." This table shows the total income of community residents (residents' income) divided according to source, inside or outside the community. Inside sources include labor and property income, while outside sources include property income and transfer payments. Where out-commuting is significant, an entry to capture this appears as outside labor income. The second sub-table shows jobs by industry, with industry detail at roughly the Standard Industrial Classification (SIC) 2-digit level.[7] The final sub-table shows the labor income counterpart to the jobs sub-table. The total of labor income at the bottom of this table matches the same as shown in the inside income portion of the community income account.

Definitions for the terms used in the economic profile summaries are as follows:

Community Income Account: Total income of community residents (residents' income), divided according to source (inside or outside the community).

Residents' Income: The total before-tax income of persons living within the boundaries of the community. It can be thought of as income generated in the community, less the claims of in-commuters and absentee owners, plus the income of out-commuters, income from ownership of property outside the community, and transfer payments.

Labor Income: Sometimes called "earnings;" includes wages, salaries, and proprietors' income.

Jobs: Includes both full and part time, and refer to the annual average of monthly employment. Thus, a person who holds two part-time jobs for the full year will appear as two jobs, while two persons employed for six months each will appear in the table as one job.

Property Income: Income from the ownership of private held equities and real estate. Includes claims on the profit of corporations, and any other payments classed as dividends, interest, and rent. Includes private pension income.

Inside Property Income: Income generated on property located within the boundaries of the community. In rural communities this normally includes rental income on real estate, and the income of incorporated businesses located in the community. Inside property income excludes claims by non-residents (or absentee) owners. Thus, the property income of a locally owned grocery store or restaurant will be included, while that of a national chain will be excluded.

[7] A list of the SIC categories is included in the planning record.

<u>*Outside Property Income:*</u> Income generated outside the community, but claimed by community residents. It will include claims on outside corporate income, normally paid as dividends, capital gains and interest payments on corporate stocks and bonds, and mutual fund income, and so on. It will also include money market and other bank interest, and rental income on real estate located outside the community. Private pension income is included in outside property income.

<u>*Transfer Payments:*</u> Payments to community residents (normally by government) that do not result from current production, and for which no services are currently rendered. Examples include social security, veterans' payments, public assistance, and unemployment compensation.

Cascade

In 2000 Cascade had a population of 997. The community lies about 70 miles north of Boise and the surrounding Treasure Valley, and about 30 miles south of McCall. The town is bisected by State Highway 55, a major north-south route through southern Idaho. Cascade adjoins Lake Cascade (formerly Cascade Reservoir), which provides flood control, irrigation, and extensive summer and winter recreation.

Cascade was founded in 1912 by the consolidation of three communities: Van Wyck, Thunder City, and Crawford. The town was named for the Cascade Falls on the North Fork Payette River; the falls were largely obliterated with creation of Cascade Reservoir.

Today's Cascade includes one hospital, one school district, and one municipal airport, which also serve the backcountry interior of central Idaho. The community's largest employers is Valley County; a Boise Cascade Corporation sawmill, the town's largest employer, closed in June 2001. The Cascade Ranger District office of the Boise National Forest is also located in Cascade.

The effects of the Boise Cascade mill closure are not yet known. However, a policy review discussing employment and displacement among Northwest forest products workers was published in March 2000 (Carroll et al. 2000). This review found some common themes in different case studies of displaced wood products workers in the Pacific Northwest. For example, the studies suggest that social context, including family and community, play important roles in the lives of displaced workers, and to focus only on job creation and/or availability and wages misses important aspects of the situation.

In addition, the authors found that despite several years of studies:

> *" . . .we lack a unifying and satisfying theoretical explanation for predicting when rural blue-collar workers will choose when staying with an occupation and moving elsewhere to do so versus trying to find other work in their community of place. In many cases workers and their families do not perceive themselves to have clear choices at times of employment crisis, and decision making often takes place amid an excruciating welter of depression, conflicting considerations, and many uncertainties."* (Carroll et al. 2000)

In the 1996 Harris community self-assessment, Cascade rated itself very high in regional attractiveness, quality of life, and community attractiveness (greater than 6.0 on the 1-7 relative scale). Cascade also gave itself a moderate rating in the degree to which it is linked economically, socially, and physically to neighboring communities. These links include but are not limited to social activities, work, and shopping.

The EMSI economic profile of Cascade includes the local communities of Round Valley, Clear Creek, Smiths Ferry, and Warm Lake, as well as Cascade. This profile shows a total of 878 jobs in the community in 2000, and labor income of $18,645,000. (Although the Boise Cascade mill did not close until 2001, the figures shown below for the year 2000 include the mill closure, to more fully reflect the current situation while retaining a consistent baseline year to allow comparison with other communities.) Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-a. Economic Profile of Cascade: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	18,645	21,700	24,828
Property income	4,405	5,127	5,866
Outside Income ($1,000)			
Property income	8,248	9,599	10,983
Transfer payments	12,292	14,306	16,369
Total Residents' Income ($1,000)	43,590	50,733	58,045
Jobs by Industry (Top 5 Sectors)			
State and local government	256	273	288
Trade	124	139	152
Finance, Insurance, Real Estate	84	90	100
Motels/eating, drinking	84	95	102
Medical/education/social services	57	70	79
Total Jobs in Community	878	961	1,038
Labor Income by Industry ($1,000) (Top 5 Sectors)			
State and local government	5,899	6,883	7,925
Federal government	2,328	2,707	3,109
Motels/eating and drinking	2,011	2,297	2,583
Finance, Insurance, Real Estate	1,727	2,008	2,409
Medical/education/social services	1,296	1,660	1,988
Total Labor Income by Industry ($1,000)	18,645	21,700	24,828

Phil Davis, Valley County Commissioner who lives in the Cascade area, sees more people and traffic in the Cascade area, especially on weekends. He also notes an increase in the number of retirees who have become residents. Davis sees a large number of part-time residents and visitors, and an associated need to provide services—such as search and rescue, road maintenance, law enforcement and judicial services—to those who visit the area (including the National Forests). He notes that at least half of the felony prosecutions originate in actions undertaken on public lands (Davis 1998).

Challis

The community of Challis adjoins U.S. Highway 93, a primary access route from southern Idaho to northeastern Idaho and Montana. With a 2000 population of 909, Challis is the county seat of Custer County. The community lies about 60 miles south of Salmon, and about 55 miles northeast of Stanley.

Challis was founded in 1878 and became a trading center for miners in the Stanley Basin, Yankee Fork, Loon Creek, and Bayhorse. Connected to Custer by a toll road, the town was named for Alvan P. Challis, surveyor of the town site.

Challis today is served by a small airport, a general clinic, and school district. The community's largest employers are Hecla Mining and Thompson Creek Mining, followed by Challis Schools and the Forest Service.

In the 1996 Harris community self-assessment, Challis participants rated their community as high in regional attractiveness (6.14 on a 1 - 7 scale) but quite low in orientation towards the future (2.29).

The EMSI economic profile of Challis includes Challis and nearby Clayton. This profile shows a total workforce in 2000 of 1,220 persons and labor income of $31,521,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-b. Economic Profile of Challis: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	31,521	34,661	37,790
Property income	2,602	2,861	3,119
Outside Income ($1,000)			
Property income	7,311	8,040	8,765
Transfer payments	8,501	9,348	10,192
Total Residents' Income ($1,000)	49,935	54,910	59,866
Jobs by Industry (Top 5 Sectors)			
Mining/sand and gravel	217	217	215
Agriculture and agricultural services	190	190	190
Federal government	116	132	147
Construction	107	117	127
Trade	98	106	114

Community Income Account	2000	2005	2010
Total Jobs in Community	1,220	1,278	1,350
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Mining/sand and gravel	8,690	9,424	9,755
Agriculture and agricultural services	4,305	4,580	4,871
Federal government	4,129	4,858	5,626
Construction	2,293	2,585	2,894
Public utilities	2,064	2,181	2,232
Total Labor Income by Industry ($1,000)	31,521	34,661	37,790

Custer County Commissioners Melodie Baker, Ted Strickler and Lin Hintze see the commitment the citizens have to one another, the “barn-raising attitude” and county residents “being there for each other in any way possible” as the strengths of the county. By contrast, they also see as “pressure by agencies enforcing their regulations” and “pressure from the threat of designations such as endangered species chinook salmon, Wild and Scenic Rivers, Upper Columbia River Basin, etc.” as the biggest changes in the county since the mid-1980s, noting that the county’s “basic way of life has been eroded or destroyed,” and “multiple use is no longer a benefit to the long-term resident” (Baker et al. 1998).

The commissioners also see a change in the county's social fabric:

> *"Our time is spent going to meetings trying to figure out how we are going to deal with another regulation, designation, or restriction on us. Personal interactions between agency personnel and resource users have become very strained from differences of opinion on how the public resource should be managed." (Baker et al. 1998)*

Council

Council is located along U.S. Highway 95, a major north-south route through Idaho. The county seat of Adams County, the community lies about 37 road miles southwest of McCall and about 50 miles northeast of Weiser. Council's 2000 population was 816.

Council was named for Native American councils held regularly near the town site, during which several tribes would trade, play sports, and fish for salmon. Homesteading began in 1876, and a post office was established in 1878. By 1899, the Pacific and Idaho Northern Railroad had been extended and Council included several permanent settlers.

Today's Council includes a small municipal airport, a hospital, two general clinics, and a school district. The community’s largest employers are Adams County, the Council Community Hospital, Council School District #13, and the Payette National Forest.

The EMSI economic profile of Council includes Council and the nearby community of Indian Valley. This profile shows a total workforce of 1,103 persons and labor income of $29,042,000 in 2000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-c. Economic Profile of Council: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	29,042	31,796	34,696
Property income	2,205	2,414	2,635
Outside Income ($1,000)			
Property income	8,482	9,254	10,067
Transfer payments	12,214	13,326	14,497
Total Residents' Income ($1,000)	51,943	56,791	61,895
Jobs by Industry (Top 5 Sectors)			
Agriculture and agricultural services	295	303	315
State and local government	184	197	211
Trade	105	116	127
Federal government	100	107	114
Construction	99	104	111
Total Jobs in Community	1,103	1,164	1,230
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agriculture services	6,796	7,409	8,189
Mining/sand and gravel	3,998	4,334	4,490
Federal government	3,910	4,345	4,833
State and local government	3,770	4,205	4,688
Wood and paper processing	3,598	3,795	3,996
Total Labor Income by Industry ($1,000)	29,042	31,796	34,696

Leon Newman, Adams County Commissioner who lives in Council, says that it has been difficult to attract business due to the lack of infrastructure within the county, and he notes that the area needs help in making major changes to the infrastructure if the economic base is to change. He also senses that the new jobs that have come to the area are primarily low paying, without benefits. Newman has also seen an influx of retirees to the area, seeking a more rural lifestyle (Newman 1998).

Crouch-Garden Valley

The communities of Crouch and Garden Valley lie about three miles apart, in a wide valley near the confluence of the Middle and South Forks Payette River. Crouch is an incorporated community with a population in 2000 of 154 persons. Both communities lie in Boise County, about 50 miles northeast of Boise and the surrounding Treasure Valley. The Banks-Lowman highway, widened and paved in the mid-1990s, adjoins the communities and provides year-round access between Banks and Lowman, as well as major access to central Idaho.

Established in 1934, Crouch was named for William Crouch. Garden Valley was founded by farmers who arrived in 1870 and named the town after the area's scenic yet fertile character. The EMSI economic profile of Crouch-Garden Valley includes the local community of Banks, as well as Crouch and Garden Valley. This profile shows a total workforce in 2000 of 632 people and labor income of $13,073,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-d. Economic Profile of Crouch-Garden Valley: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	13,073	14,929	16,952
Property income	1,685	1,924	2,185
Outside Income ($1,000)			
Property income	1,582	1,805	2,047
Transfer payments	2,741	3,127	3,546
Total Residents' Income ($1,000)	19,082	21,784	24,730
Jobs by Industry (Top 5 Sectors)			
Motels/eating and drinking	98	106	113
Construction	94	103	113
Agriculture and agriculture services	94	96	99
State and local government	61	68	75
Federal government	55	62	69
Total Jobs in Community	632	690	751
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agricultural services	3,247	3,540	3,873
Federal government	2,065	2,401	2,757
Construction	1,836	2,073	2,338
State and local government	1,319	1,539	1,772
Business services	1,031	1,297	1,558
Total Labor Income by Industry ($1,000)	13,073	14,929	16,952

With its proximity to Boise, Crouch-Garden Valley and other Boise County communities include many residents who work in the Treasure Valley. John Dyer, Boise County Commissioner notes that many county residents now work outside of the county, whereas in the past, many jobs came from the timber products industry located in the county (Dyer 1998).

Emmett

Emmett, the county seat of Gem County, adjoins the main Payette River. With a 2000 population of 5,490 persons, the community is located about 30 miles northwest of Boise and the surrounding Treasure Valley, and is adjacent to State Highway 52, an east-west route between Horseshoe Bend and Ontario, Oregon.

The first wagon train of emigrants and prospectors entered the Payette Valley in 1862, crossing the Payette River where Emmett is now situated. A ferry was built in 1862, with a post office established a few years later. Emmett is named for Emmett Cahalan, the first white child born in the area.

Today, Emmett is served by one hospital, as well as a school district and municipal airport. The community's largest employers include Albertsons grocery and pharmacy, and Walter Knox Hospital. The town's former largest employer, a Boise Cascade sawmill, closed in June 2001.

The effects of the Boise Cascade mill closure are not yet known. However, a policy review discussing employment and displacement among Northwest forest products workers was published in March 2000 (Carroll et al. 2000). This review found some common themes in different case studies of displaced wood products workers in the Pacific Northwest. For example, the studies suggest that social context, including family and community, play important roles in the lives of displaced workers, and to focus only on job creation and/or availability and wages misses important aspects of the situation.

In addition, the authors found that despite several years of studies:

> *" . . .we lack a unifying and satisfying theoretical explanation for predicting when rural blue-collar workers will choose when staying with an occupation and moving elsewhere to do so versus trying to find other work in their community of place. In many cases workers and their families do not perceive themselves to have clear choices at times of employment crisis, and decision making often takes place amid an excruciating welter of depression, conflicting considerations, and many uncertainties."* (Carroll et al. 2000)

In the 1996 Harris community self-assessment, Emmett participants rated themselves moderately high in all categories, especially regional attractiveness (6.63 on a 1-7 relative scale). The community rated itself lowest in autonomy (4.75), meaning that it is moderately linked to neighboring communities, from economic, social, and physical perspectives.

The EMSI economic profile of Emmett includes the local communities of Sweet, Ola, and Letha, as well as Emmett. This profile shows a total workforce in 2000 of 5,366 people and labor income of $107,958,000. (Although the Boise Cascade mill did not close until 2001, the figures shown below for the year 2000 include the mill closure, to more fully reflect the current situation while retaining a consistent baseline year to allow comparison with other communities.) Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-e. Economic Profile of Emmett: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	107,958	118,349	129,606
Property income	10,536	11,550	12,649
Outside Income ($1,000)			
Property income	23,367	25,616	28,053
Transfer payments	54,675	59,938	65,639
Total Residents' Income ($1,000)	196,536	215,452	235,947
Jobs by Industry (Top 5 Sectors)			
Agriculture and agricultural services	1,254	1,254	1,254
Trade	862	944	1,034
State and local government	556	596	637
Medical/education/social services	586	633	673
Construction	510	543	578
Total Jobs in Community	5,366	5,654	5,952
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agricultural services	28,823	25,319	26,907
Construction	16,685	18,253	20,017
State and local government	13,259	14,786	16,486
Trade	11,014	12,324	13,820
Medical/education/social services	9,308	10,614	11,866
Total Labor Income by Industry ($1,000)	107,958	118,349	129,606

Fairfield

Fairfield is located along U.S. Highway 20, which is a primary access route between Boise, Treasure Valley and southwest Idaho, and the Ketchum/Sun Valley area and central Idaho. The community is located almost 60 miles northeast of Mountain Home, and nearly 50 miles southwest of Ketchum/Sun Valley. Fairfield is the county seat of Camas County, and in 2000 had a population of 395 persons.

The first settlers in the Fairfield area arrived in 1880, with many more following after the Reclamation Act of 1902 was passed. The original town (Old Soldier) was moved to the present town site when the railroad came through, and renamed as Fairfield, which described the surrounding Camas Prairie.

A small airport serves today's Fairfield. The largest employers include Soldier Mountain Resort, Camas County School District, Camas County, and the Country Kitchen/Inn restaurant.

Fairfield was not included in the 1996 Harris community self-assessment study.

The EMSI economic profile of Fairfield includes the nearby communities of Corral and Hill City, as well as Fairfield. This profile shows a total workforce in 2000 of 642 persons and labor income of $14,216,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Camas County Commissioner Matt McLam, who lives in Fairfield, notes that, "Economics is the number one thing that needs improvement. It's slim pickings in Camas County and you've got to hustle to make a go of it" (McLam 1998). He described the "ripples" of economic and social changes that have occurred in recent years:

> *"In 1980, the sawmill quit taking lumber and eventually closed. Twenty-five to 35 men were working at the site. When the sawmill went, so did the railroad. With the railroad gone, the grain industry suffered. Many farmers switched to bailing hay, especially alfalfa hay for the dairy industry. Two years ago, when Hollywood star Bruce Willis bought the ski resort, you couldn't rent a post office box; you couldn't even find a place to rent. Lots of speculation forced up land prices, hurting farmers' prospects for buying land. Once the speculations ended, farms were owned by fewer people, and took in greater acreages. Now the area ships out a lot of dairy hay. The big farmers are more specialized than they once were." (McLam 1998)*

Table SO-f. Economic Profile of Fairfield: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	14,216	15,733	17,316
Property income	1,393	1,636	1,876
Outside Income ($1,000)			
Property income	2,933	3,444	3,949
Transfer payments	3,517	4,044	4,681
Total Residents' Income ($1,000)	22,060	24,858	27,821
Jobs by Industry (Top 5 Sectors)			
Agriculture and agricultural services	149	149	149
Trade	87	98	110
State and local government	83	90	97
Motels/eating, drinking	79	93	106
Medical/educational/social services	55	63	70
Total Jobs in Community	642	701	757

Community Income Account	2000	2005	2010
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agricultural services	6,814	7,242	7,696
State and local government	1,699	1,907	2,136
Federal government	1,312	1,467	1,639
Medical/educational/social services	926	1,123	1,320
Construction	681	773	870
Total Labor Income by Industry ($1,000)	14,216	15,733	17,316

Fairfield Mayor Fred Johnson also sees changes in Fairfield, noting that the community has become a "bedroom community" of the Wood River Valley (Ketchum/Sun Valley and environs). He also sees a need for jobs that "fit the community," wanting "opportunities for local kids to stay in the area to pursue careers" (Johnson 1998).

Gooding

Gooding, the county seat of Gooding County, is located about 30 road miles northwest of Twin Falls. The community is accessed via State Highway 46, about 12 miles north of Interstate 84, or via U.S. Highway 26, a major east-west route between Bliss and Arco, which adjoins the community on the south side. In 2000 the population of Gooding was 3,384 persons.

Today Gooding is served by a municipal airport, as well as a hospital and school system. The largest employers include the Idaho State School, which provides education for deaf and blind children and adolescents, the Gooding School District, and Gooding Rehabilitation and Living Center.

Gooding was not included in the 1996 Harris community self-assessment survey.

The economic profile of Gooding developed by EMSI shows a total workforce in 2000 of 3,338, with total labor income of $8,746,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-g. Economic Profile of Gooding: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	87,746	97,995	108,305
Property income	6,923	7,916	8,899
Outside Income ($1,000)			
Property income	12,532	14,330	16,109
Transfer payments	2,301	2,589	2,941
Total Residents' Income ($1,000)	109,502	122,830	136,254
Jobs by Industry (Top 5 Sectors)			
Agriculture and agricultural services	652	671	683
State and local government	601	648	697
Medical/education/social services	447	510	566
Trade	405	455	509
Food processing	262	277	276
Total Jobs in Community	3,338	3,615	3,875
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agricultural services	33,397	36,514	39,482
State and local government	12,975	14,563	16,313
Transportation	8,183	8,510	8,931
Medical/education/social services	7,181	8,638	10,080
Trade	6,713	7,710	8,829
Total Labor Income by Industry ($1,000)	87,746	97,995	108,303

Hailey-Bellevue

Hailey and Bellevue lie about four miles apart along State Highway 75, a primary access route between Twin Falls and south central Idaho, and the Ketchum/Sun Valley and points north. The communities are located about 40 miles north of Twin Falls, Idaho and about 12 miles south of Ketchum/Sun Valley. Hailey is the county seat of Blaine County. In 2000, Hailey had a population of 6,200 persons, while Bellevue included 1,876 residents.

Hailey is named for John Hailey, manager of the Utah, Idaho and Oregon State Company who donated the land for the town site in the early 1880s. The town was the center of the Mineral Hill Mining District, growing rapidly until the boom collapsed in 1889. Hailey served two terms as the Idaho Territory's delegate to the U.S. Congress. Bellevue was founded in 1880 after the discovery of the Minnie Moore Mine. In the 1880s, it was locally known as Gate City, because it provided access to the Wood River Valley. Bellevue was originally known as Biddyville, but the name was changed when the town served briefly as the county seat in the 1890s. Bellevue is French for "beautiful view."

Hailey and Bellevue today are served by a small airport, a hospital, and two part-time clinics. Hailey's largest employers include Power Engineers, a regional engineering firm, and the Blaine County School District. In Bellevue, School District #61, The Wood Connection cabinetmakers, and City of Bellevue employ the greater number.

In the 1996 Harris community self-assessment study, Hailey rated itself high in quality of life (6.60 on the 1.00 - 7.00 scale) and diversity (6.00), but lower in autonomy (4.60). Bellevue was not included in the Harris study.

The EMSI economic profile of Hailey-Bellevue includes both communities. This profile shows a total workforce in 2000 of 4,607 and labor income of $134,468,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-h. Economic Profile of Hailey-Bellevue: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	134,468	155,270	177,156
Property income	32,052	36,874	41,628
Outside Income ($1,000)			
Property income	59,795	68,791	77,661
Transfer payments	21,647	24,601	28,253
Total Residents' Income ($1,000)	247,962	285,537	324,697
Jobs by Industry (Top 5 Sectors)			
State and local government	860	928	998
Construction	706	776	846
Trade	532	602	676
Motels/eating, drinking	400	458	507
Medical/education/social services	332	385	430
Total Jobs in Community	4,607	5,074	5,533
Labor Income by Industry ($1,000) (Top 5 Sectors)			
State and local government	23,724	26,626	29,826
Construction	19,692	22,222	24,995
Medical/education/social services	14,657	17,923	21,063
Trade	13,288	15,369	17,650
Business services	13,02	15,970	18,829
Total Labor Income by Industry ($1,000)	134,468	155,70	177,156

Blaine County Commissioner Len Harlig notes that the county, which includes the Hailey/Bellevue area, continues to struggle with a lack of affordable housing. He also sees a change in the area's ways of doing business:

"Because of improvements in electronic communication technology, there has been an increase in residents who are capable of conducting business electronically. So there has been an increase in these well educated, more affluent permanent residents who remain here, but conduct their business elsewhere. The county does not encourage industrial businesses or large-scale industries, but does encourage communication and service companies." (Harlig 1998)

Idaho City

The county seat of Boise County, Idaho City's 2000 population was 458. Idaho City lies about 30 miles northeast of Boise and the surrounding Treasure Valley. Much of the community adjoins State Highway 21, a major northeast route from Boise to central Idaho.

Founded in 1862, Idaho City was the most important mining town in the Boise Basin, and was once the largest city in the Pacific Northwest. The post office was established in 1864.

Today's Idaho City includes one school district and medical services (no hospital). Idaho City's largest employers are the Boise National Forest (Idaho City Ranger District) and Boise County. Many Idaho City residents commute to jobs in Boise and other Treasure Valley communities.

In the 1996 Harris community self-assessment, Idaho City rated itself somewhat high in terms of regional attractiveness (5.83 on a relative 1-7 scale), with moderate ratings in other areas. The community rated itself lowest on the degree to which community residents work together to get things done (3.83), as well as leadership and local government effectiveness (4.17).

The EMSI economic profile of Idaho City includes the local communities of Centerville and Pioneerville, as well as Idaho City. This profile shows a total workforce in 2000 of 724 people and labor income of $14,016,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-i. Economic Profile of Idaho City: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	14,016	16,204	18,602
Property income	1,543	1,784	2,048
Outside Income ($1,000)			
Property income	2,364	2,731	3,134
Transfer payments	6,008	6,942	7,965
Total Residents' Income ($1,000)	23,931	27,661	31,750

Community Income Account	2000	2005	2010
Jobs by Industry (Top 5 Sectors)			
State and local government	189	212	235
Amusement and recreation	100	106	117
Motels/eating and drinking	82	88	94
Federal government	78	88	97
Construction	64	71	78
Total Jobs in Community	724	801	882
Labor Income by Industry ($1,000) (Top 5 Sectors)			
State and local government	4,103	4,787	5,512
Federal government	2,915	3,389	3,893
Amusement and recreation	1,426	1,590	1,849
Construction	1,252	1,421	1,613
Medical/education/social services	1,089	1,344	1,599
Total Labor Income by Industry ($1,000)	14,016	16,204	18,602

With its proximity to Boise, Idaho City and other Boise County communities include many residents who work in the Treasure Valley. John Dyer, Boise County Commissioner who lives in Idaho City, notes that many county residents now work outside of the county, whereas in the past, many jobs came from the timber products industry located in the county (Dyer 1998).

Ketchum-Sun Valley

The community of Ketchum is bisected by State Highway 75, which accesses the Ketchum/Sun Valley area and points north, from Twin Falls and other southern Idaho cities. The community of Sun Valley adjoins Ketchum to the northeast and is itself adjacent to the internationally famous Sun Valley ski and summer resort. In 2000 Ketchum's population was 3,003, while Sun Valley's 2000 population was 1,427. The communities are located in Blaine County, about 130 miles northeast of Boise and the Treasure Valley, and about 80 miles north of Twin Falls.

Ketchum is named for first settler David Ketchum, who built a cabin here in 1879. First called Leadville, the town was renamed when an 1880 application to establish a post office was denied because there were already several communities named Leadville.

The Ketchum/Sun Valley area is today served by an airport 12 miles to the south in Hailey, as well as a medical center in Sun Valley. Ketchum's largest employers include Atkinson's Market, the Sawtooth National Forest, Smith's Sport Optics, and Premier Resorts. In Sun Valley, the largest employers include the Sun Valley Resort, the Wood River Medical Center, and the Elkhorn Resort and Golf Club.

In the 1996 Harris community self-assessment, Ketchum participants rated their community extremely high in regional attractiveness (7.00 on a 1.00 to 7.00 scale), and lower in business attractiveness (4.33). Sun Valley was not included in the Harris study.

The EMSI economic profile of Ketchum/Sun Valley includes both communities. This profile shows a total workforce in 2000 of 10,812 persons, with earnings of 427,366,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Ketchum Mayor Guy Coles notes that the Ketchum/Sun Valley area, once known largely for winter skiing, has been "discovered," with the summer season equally as popular as the winter (Coles 1998). Blaine County Commissioner Len Harlig notes several changes in Blaine County, which encompasses the Ketchum/Sun Valley communities. He sees a shift in population from Ketchum to Hailey, 12 miles to the south. He also sees a change in demographics and character:

> *"There has also been a change in demographics in the county. The population was very diverse in 1973, and it covered both ends of the spectrum, although all were fairly well educated, and all participated in the community. The diversity of population is decreasing. Lower income class and town 'characters' are being driven out by ordinances and rising property values. Some of the changes which are reducing population diversity are inadvertent, some are not.*
>
> *We in the county have become more regulated. There is less free exchange of ideas between parties, and the communication is becoming more lawyer vs. neighbor and vs. community, and less between neighbors and within the community. People have stopped talking with each other and have started talking at each other. There has been a shift to litigation, away from community vision, and more into self-serving vision." (Harlig 1998)*

Table SO-j. Economic Profile of Ketchum-Sun Valley: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	293,896	348,552	408,713
Property income	22,788	26,675	30,468
Outside Income ($1,000)			
Property income	93,463	109,404	124,962
Transfer payments	17,219	20,968	25,201
Total Residents' Income ($1,000)	427,366	505,599	589,344
Jobs by Industry (Top 5 Sectors)			
Motels/eating, drinking	2658	3,062	3,397
Trade	1,458	1682	1,902
Amusement and recreation	1,368	1,533	1,768
Construction	1,358	1,507	1,675
Finance, insurance, real estate	1,236	1,360	1,571
Total Jobs in Community	10,812	12,219	13,665

Community Income Account	2000	2005	2010
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Motels/eating, drinking	43,775	52,432	60,451
Construction	37,881	43,154	49,483
Trade	36,422	42,941	49,678
Amusement and recreation	37,659	44,520	54,012
Finance, insurance and real estate	35,086	41,965	52,339
Total Labor Income by Industry ($1,000)	293,896	348,552	408,713

McCall-Donnelly

The communities of McCall and Donnelly lie approximately 13 miles apart in Long Valley, along State Highway 55, part of a major north-south route through southern Idaho. In 2000, McCall's population was 2,084, while Donnelly's population was 138. The McCall-Donnelly community lies approximately 90-100 miles north of Boise and the surrounding Treasure Valley. McCall is located on the shores of Payette Lake, known regionally for its summer and winter recreation and scenery. In addition, Brundage Mountain, a winter and summer resort, lies about 5-10 miles northwest of McCall.

McCall is named for Thomas McCall, who first camped on the shores of Payette Lake in 1899. The town site was platted in 1901, and a permanent post office was established in 1905. Donnelly was settled about 1890, primarily by Finns. Donnelly grew substantially after the railroad came through in 1912.

Today a small airport, as well as a hospital and school district serve the McCall-Donnelly area. The community's largest employers include The Club restaurant and bar in Donnelly; and in McCall, the Payette National Forest, McCall-Donnelly Schools, the Whitetail Club, and the Brundage Mountain Resort.

In the 1996 Harris community self-assessment, Donnelly participants rated themselves quite high on the regional attractiveness scale (6.00 on a 1-7 relative scale), but quite low in autonomy (2.14), meaning that it sees itself highly linked to neighboring communities, from economic, social, and physical perspectives. McCall was not part of the Harris study.

In 2000 McCall adopted a Comprehensive Plan to " . . . integrate the concerns and expressions of the community into a document that recommends how the City should grow and develop." Through the planning process, local citizens developed as a desired future "a diverse small town united to maintain a safe, clean, healthy and attractive environment. A friendly, progressive community that is affordable and sustainable." Some specific environmental goals include preserving and enhancing the area's natural resources, with objectives such as creating an easily-accessible system of natural wildlife areas, open spaces and trails; encouraging recycling and conservation activities; and addressing air quality issues. Land use goals include retaining the rural character of the area surrounding the developed portion of McCall (City of McCall 2000).

The EMSI economic profile of McCall-Donnelly includes the two communities. This profile shows a total workforce in 2000 of 4,420 people and labor income of $88,778,000. Summaries of the Community Income Account and the community's major industries are shown below.

Table SO-k. Economic Profile of McCall-Donnelly: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	88,461	102,309	116,730
Property income	9,280	10,733	12,246
Outside Income ($1,000)			
Property income	27,792	32,127	36,641
Transfer payments	26,683	30,845	35,179
Total Residents' Income ($1,000)	152,216	176,015	200,796
Jobs by Industry (Top 5 Sectors)			
Motels/eating and drinking	833	934	1,005
Construction	573	619	675
State and local government	439	439	477
Finance, Insurance, Real Estate	322	343	381
Medical/educational/social services	313	379	432
Total Jobs in Community	4,403	4,811	5,253
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Federal government	12,438	14,462	16,610
Construction	11,289	12,527	14,088
State and local government	10,107	11,793	13,579
Motels/eating, drinking	7,655	8,892	9,979
Finance, Insurance, Real Estate	6,622	7,660	9,180
Total Labor Income by Industry ($1,000)	88,461	102,309	116,730

New Meadows

New Meadows is located near the intersection of U.S. Highway 95 and State Highway 55, which are together part of a major north-south route through Idaho. With a 2000 population of 533, the community is located in Adams County, about 12 miles northwest of McCall, 90 miles north of Boise and the Treasure Valley, and about 80 miles south of Grangeville.

When The New Meadows area was first settled in the 1860s and in the late 1870s, it was known as White's Mail Station. New Meadows itself began in 1910 as the northern terminus for the Pacific and Idaho Northern Railroad. It is named for the meadows surrounding the town.

New Meadows today is serviced by a small airport and a part-time general medical clinic. The community's largest employers include the Payette National Forest, the Evergreen lumber mill and electricity cogeneration plant, and J.I Morgan logging and trucking operation.

In the 1996 Harris community self-assessment, New Meadows participants rated their community somewhat low in community attractiveness (3.63 on a 1-7 scale) but quite high in regional attractiveness (6.38).

The EMSI economic profile of New Meadows includes the nearby community of Old Meadows, as well as New Meadows. This profile shows a total workforce in 2000 of 679 persons and labor income of $24,494,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-l. Economic Profile of New Meadows: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	24,494	26,363	28,267
Property income	1,467	1,579	1,693
Outside Income ($1,000)			
Property income	6,120	6,569	7,026
Transfer payments	5,536	5,942	6,356
Total Residents' Income ($1,000)	37,617	40,452	43,341
Jobs by Industry (Top 5 Sectors)			
Wood and paper processing	160	160	160
Agriculture and agricultural services	103	106	110
Construction	95	99	103
Federal government	72	77	83
Trade	63	70	76
Total Jobs in Community	679	711	741
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Wood and paper processing	10,679	11,265	11,862
Federal government	2,829	3,143	3,496
Agriculture and agricultural services	2,418	2,636	2,913
Mining/sand and gravel	1,999	2,167	2,245
Construction	1,844	1,970	2,117
Total Labor Income by Industry ($1,000)	24,494	26,363	28,267

Oakley Valley

Oakley Valley, which is marked by the community of Oakley, lies about 20 miles south of Interstate 84, and about 17 miles south of Burley, along State Highway 27. With a 2000 population of 668, the community is located in Cassia County, about 60 highway miles southeast of Twin Falls.

Named for stage station operator Thomas Oakley, Oakley was settled by Mormon families from Tooele, Utah in the late 1870s. A post office was established in 1876.

Oakley today is served by a hospital in Burley (17 miles north), and by a small municipal airport. The community provides summer access to the City of Rocks National Reserve, jointly managed by the National Park Service and the Idaho Department of Parks and Recreation.

Oakley was not included in the 1996 Harris community self-assessment.

The EMSI economic profile of Oakley Valley includes Oakley and surrounding residents. This profile shows a total workforce in 2000 of 421 persons and labor income of $12,871,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-m. Economic Profile of Oakley Valley: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	12,871	14,135	15,994
Property income	902	1,041	1,180
Outside Income ($1,000)			
Property income	4,796	5,538	6,276
Transfer payments	7,874	8,907	10,199
Total Residents' Income ($1,000)	26,444	29,621	33,049
Jobs by Industry (Top 5 Sectors)			
Agriculture and agricultural services	126	126	126
Trade	69	76	83
State and local government	54	59	63
Mining/sand and gravel	52	52	52
Consumer services	32	36	40
Total Jobs in Community	421	449	474

Community Income Account	2000	2005	2010
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agricultural services	5,919	6,290	6,685
Mining/sand and gravel	1,481	1,605	1,663
Trade	1,438	1,609	1,800
State and local government	1,277	1,436	1,610
Federal government	838	939	1,051
Total Labor Income by Industry ($1,000)	12,871	14,135	15,394

Raft River Valley

For the purposes of this socio-economic overview, the Raft River Valley includes the communities of Almo, Elba, and Malta, which lie south of State Highway 77. Malta, the northernmost of the three communities, lies about 30 miles southeast of Burley, and about 15 miles south of Interstate 84. Elba lies about 10 miles southwest of Malta, with Almo located about 12 miles south of Elba.

Almo was an early stage stop on the Boise-Kelton stage route; its post office was established in 1882. Located near the headwaters of Cassia Creek, Elba was settled by Mormons in 1871. Malta's post office was established in 1883. The town was named for the Isle of Malta in the Mediterranean Sea.

The Raft River Valley communities are located in Cassia County. Malta's population in 2000 was 177 persons. No comparable population figures for Almo or Elba are readily available.

The Raft River Valley was not included in the 1996 Harris community self-assessment.

The EMSI economic profile of the Raft River Valley includes Almo, Elba, and Malta. This profile shows a total workforce in 2000 of 643 persons and labor income of $23,237,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-n. Economic Profile of Raft River Valley: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	23,237	25,297	27,196
Property income	1,556	1,833	2,110
Outside Income ($1,000)			
Property income	3,718	4,378	5,039
Transfer payments	7,474	8,526	9,826
Total Residents' Income ($1,000)	35,986	40,033	44,170
Jobs by Industry (Top 5 Sectors)			
Agriculture and agricultural services	304	304	304
State and local government	53	57	62
Public utilities	53	55	55
Amusement and recreation	37	45	51
Motels/eating, drinking	35	51	61`
Total Jobs in Community	643	688	721
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Agriculture and agricultural services	14,287	15,187	16,137
Public utilities	2,830	2,983	3,062
State and local government	1,245	1,400	1,571
Publishing and communications	1,102	1,227	1,268
Trade	626	724	820
Total Labor Income by Industry ($1,000)	23,237	1,400	1,571

Riggins

Riggins is located in Idaho County, and in 2000 had a population of 410. The community is bisected by U.S. Highway 95, a major north-south route through Idaho. Riggins lies next to the Main Salmon River, about 45 miles south of Grangeville and 45 miles northwest of McCall.

Riggins was founded in the early 1900s as a trade and mail center for local stockmen and mining camps; a post office was established in 1901. The town is named for prominent businessman and first postmaster Richard L. Riggins. Riggins today includes a general medical clinic, and the community's largest employers are the Nez Perce National Forest, School District 241, and The Family Foods grocery store.

The 1996 Harris community study included an in-depth assessment of 10 communities in the Interior West, including Riggins. Riggins participants in this study noted an overall change in natural resource policy, particularly at the federal level, that had reduced the levels of resource availability and utilization. Some recreation increase associated with outfitting and river use was also noted, as was a perceived transition to more of a retirement/public-assistance community. The study also found a definite distrust of the federal government in Riggins. In the Harris community self-assessment, Riggins participants rated their community high in regional attractiveness (6.50 on a 1-7 scale) and lowest in community services and autonomy (4.38).

The economic EMSI profile of Riggins includes Riggins and the nearby communities of Lucile and Pollock. This profile shows a total workforce in 2000 of 643 people and labor income of 13,296,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-o. Economic Profile of Riggins: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	13,296	14,918	16,509
Property income	1,450	1,663	1,869
Outside Income ($1,000)			
Property income	3,918	4,493	5,049
Transfer payments	1,205	1,353	1,531
Total Residents' Income ($1,000)	19,869	22,427	24,957
Jobs by Industry (Top 5 Sectors)			
Motels/eating and drinking	128	144	157
Federal government	89	98	106
Trade	80	89	97
State and local government	70	77	83
Agriculture and agricultural services	70	70	70
Total Jobs in Community	643	696	742
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Federal government	3,449	3,926	4,443
State and local government	1,559	1,781	2,020
Construction	1,558	1,724	1,899
Trade	1,424	1,605	1,803
Motels/eating, drinking	1,079	1,265	1,435
Total Labor Income by Industry ($1,000)	13,296	14,918	16,509

Stanley

The community of Stanley is located near the intersection of State Highway 21, a major northeast route from Boise and the Treasure Valley to central Idaho, and State Highway 75, which accesses central Idaho from Twin Falls and other southern Idaho cities. With a 2000 year-round population of 100, the community is located in Custer County, about 130 miles northeast of Boise, nearly 140 miles north of Twin Falls, and about 55 miles southwest of Challis.

Stanley was named for John Stanley, the oldest man in an 1863 prospecting party. A post office was established in 1892.

Stanley today is served by a small airport and part-time medical clinic. The community provides primary access to the Sawtooth National Recreation Area.

In the 1996 Harris community self-assessment, Stanley participants rated their community high in mean quality of life (6.67 on a 1.00 - 7.00 scale) but low in business attractiveness (2.67).

The EMSI economic profile of Stanley includes the nearby communities of Sunbeam and Obsidian, as well as Stanley. This profile shows a total workforce in 2000 of 256 persons and labor income of $4,538,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO-p. Economic Profile of Stanley: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	4,538	5,246	5,977
Property income	698	806	919
Outside Income ($1,000)			
Property income	905	1,046	1,192
Transfer payments	1,195	1,382	1,575
Total Residents' Income ($1,000)	7,336	8,479	9,662
Jobs by Industry (Top 5 Sectors)			
Motels/eating, drinking	88	100	110
Amusement and recreation	47	55	63
State and local government	31	35	39
Trade	30	32	34
Federal government	24	27	30
Total Jobs in Community	256	288	318

Community Income Account	2000	2005	2010
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Federal government	1,595	1,877	2,174
Trade	897	982	1,077
Motels/eating, drinking	669	792	903
State and local government	477	563	654
Transportation	396	433	475
Total Labor Income by Industry ($1,000)	4,538	5,246	5,977

Custer County Commissioners Melodie Baker, Ted Strickler, and Lin Hintze believe that while recreation increases have helped by providing some jobs, they have also "provided pressures on the county to provide more services in law enforcement, emergency services, and more pressure on how the public lands are used and by whom." (Baker et al. 1998)

Treasure Valley (Boise, Nampa, Caldwell, and surrounding communities)

For the purposes of this social assessment, the Treasure Valley includes the incorporated communities[8] of Ada and Canyon Counties, which encompass the burgeoning urban/suburban corridor near Idaho's capital city of Boise. This corridor has seen rapid and dramatic growth in the last several years; for example, the population of Eagle nearly tripled in the 1990-2000 period (from 3,327 to 11,085 persons), while Meridian increased by more than two and one-half times in the same time period (1990 population of 9,596 to 34,919 residents in 2000).

With a post office established in 1863, Boise was named for the Boise River, which in turn was named by French-Canadian explorers and trappers for the variety of trees (les bois) growing along its banks. Nampa was named after a Shoshoni Indian known as Namp-Puh, with a post office founded in 1887. The town site of Caldwell was platted in 1883 by the Idaho and Oregon Land Improvement Company, headed by Kansas Senator C.A. Caldwell. Named for the nearby-nesting bald eagle, Eagle had a post office chartered in 1908. Meridian's post office was established in 1898, and the town was named for the Meridian Lodge, itself named after the base meridian of the Boise survey, which passed through this spot.

Today Boise and the Treasure Valley are accessed by a full-service airport in Boise, and many communities have relatively easy access to Interstate 84, part of the nationwide interstate highway system. An increasing share of the Treasure Valley's economy is tied to the burgeoning but volatile high-tech industry. Boise's largest employers include Micron and Hewlett-Packard, while Meridian and Nampa are home to the Micron Customer Service Center and Micron Electronics, respectively. The Treasure Valley (Ada and Canyon Counties) includes the highest population of Hispanics in the state; the Hispanic population in Ada County has doubled since 1990 (Idaho Commission on Hispanic Affairs 1999).

[8] Boise, Eagle, Garden City, Kuna, Meridian, Star, Caldwell, Greenleaf, Melba, Middleton, Nampa, Notus, Parma and Wilder.

Vern Bisterfeldt, Ada County Commissioner who lives in the Treasure Valley, believes that the major changes in the area's way of life are the growth in the diversity of people and what they like to do for recreation. He sees an "ever-increasing need an desire for recreational areas and undeveloped areas (i.e., open space)" (Bisterfeldt 1998).

No economic profile was developed for Boise or any other community in the Treasure Valley, because from an economic standpoint, these communities have relatively less potential for substantial impacts from National Forest management (Robison and Gneiting 1999). However, they are an important source of the demand for recreation and amenity values (such as scenery) provided by the Ecogroup National Forests.

Twin Falls

Twin Falls lies just north of the Snake River, adjacent to Interstate 84. The community is the county seat of Twin Falls County, and is located approximately 130 miles southeast of Boise and the surrounding Treasure Valley. The community also adjoins U.S. Highway 93, a major north-south route between Nevada, central Idaho and Montana; and U.S. Highway 30, which parallels Interstate 84. Twin Falls had a 2000 population of 34,469.

Twin Falls was founded in 1903 by I.B. Perrine, a promoter of the Twin Falls Investment Company. A post office was established in 1904. Most early settlers were businessmen and farmers from the Midwest.

The community's largest employers include the Magic Valley Medical Center, Lamb Weston food processing, the College of Southern Idaho, and Amalgamated Sugar Company. Twin Falls is also served by a municipal airport, three hospitals and five general clinics.

No economic profile was developed for Twin Falls, because from an economic standpoint, this community has relatively less potential for substantial impacts from National Forest management (Robison and Gneiting 1999). However, the community provides an important source of the demand for recreation and amenity values (such as scenery) provided by the Ecogroup National Forests.

Weiser

Weiser adjoins U.S. Highway 95, a major north-south route near the western Idaho border, just north of the Snake River. Weiser is the county seat of Washington County, and is located approximately 20 miles north of Ontario, Oregon, and about 70 miles northwest of Boise and the surrounding Treasure Valley. In 2000 Weiser had a population of 5,343.

The community's largest employers include Appleton Produce, Inc., Champion Home Builders, the Weiser Care Center, and the Weiser Memorial Hospital. Weiser is also served by a municipal airport and a general medical clinic.

In the 1996 Harris community self-assessment, Weiser participants rated their community high in community dependence attractiveness (6.40 on a 1-7 scale) and lowest in business attractiveness (3.60).

The EMSI economic profile of Weiser shows a total workforce in 2000 of 4,333 persons and labor income of $78,802,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table SO- q. Economic Profile of Weiser: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	78,802	86,665	95,180
Property income	8,803	10,066	11,317
Outside Income ($1,000)			
Property income	15,600	17,839	20,057
Transfer payments	46,992	52,935	60,404
Total Residents' Income ($1,000)	150,196	167,504	186,958
Jobs by Industry (Top 5 Sectors)			
Agriculture and related services	789	797	803
Trade	763	836	916
State and local government	507	543	581
Medical/education/social services	487	526	559
Construction	321	342	363
Total Jobs in Community	4,333	4,566	4,811
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Trade	13,256	14,833	16,633
Agriculture and related services	11,710	12,576	13,465
State and local government	11,388	12,693	14,146
Medical/education/social services	8,592	9,793	10,944
Construction	7,267	7,936	8,705
Total Labor Income by Industry ($1,000)	78,802	86,665	95,180

Indicators

In the Forest Plan Revision process, indicators are selected to measure the effects of the Forest Plan revision alternatives on the social and economic environment. The following are the social and economic indicators that will be "tracked" for the alternatives. These indicators correspond to variables identified in Forest Service Manual (FSM) 1972.1 and 1973.2, and Forest Service Handbook (FSH) 1909.17, for social and economic analysis.

These eight variables include:

- Population
- Employment
- Income
- Lifestyles
- Attitudes, beliefs and values
- Social organization
- Land-use patterns
- Civil rights.

For the population indicator, current and projected populations for the 17 counties and 19 communities studied in detail are included earlier in this section. Employment and income are also reported for the 19 communities.

For three of the indicators (lifestyles; social organization, land-use patterns), the discussion is organized to reflect three groups of the 19 communities described earlier. These groups include two urban communities (the Treasure Valley and Twin Falls), urban-adjacent communities (McCall-Donnelly, Ketchum-Sun Valley, Hailey-Bellevue, Idaho City, Crouch-Garden Valley, Emmett and Cascade), and rural communities (Gooding, New Meadows, Council, Riggins, Fairfield, Challis, Stanley, Oakley Valley, Raft River Valley and Weiser).

For the remaining two indicators (attitudes, beliefs, and values; and civil rights), the discussion is organized to reflect the Ecogroup area counties and communities as a whole. The "Ecogroup as a whole" was selected as the unit of measure because there is no specific data for which these indicators could be evaluated by a community (or groups of communities).

Lifestyles

Information about lifestyles in the Ecogroup area was drawn from this section's earlier discussions regarding ICBEMP, as well as county and community population changes, and county commissioner and mayor interviews.

The ICBEMP identified 12 rural-based lifestyles in the Columbia Basin. Although these 12 "lifestyle segments" are diverse, ranging from small-town, blue-collar families to retirement town seniors, they seem to share a common characteristic—an attraction to the natural setting of their communities. As noted earlier in this discussion, rural county commissioners cite the "natural beauty" of their area, as well as the wildlife and recreational opportunities. Many express a desire to continue a "multiple-use" way of life, while recognizing that economic diversity and economic development is necessary.

More urban areas, including the Treasure Valley, note dramatic growth, with newcomers originating both from within and outside Idaho. In these areas, an increasing share of the economy is tied not to resource-related employment, but to the burgeoning high-tech industry. A recent county commissioner believes that the major changes in this area's way of life are growth in diversity of people and their recreation preferences. He sees an ever-increasing need and desire for recreational areas and undeveloped areas. Although no county commissioner or mayor from the Twin Falls locale was interviewed, it is likely similar trends are occurring in this growing urban area.

Attitudes, Beliefs, and Values

Information about attitudes, beliefs and values in the Ecogroup area was drawn from this section's earlier discussions regarding ICBEMP, as well as county and community population changes, county commissioner and mayor interviews, and public opinions gathered through surveys and comments on environmental documents (including ICBEMP).

The environment and public lands are of great interest to many Westerners, including those in Idaho and the Ecogroup area. As noted earlier in this discussion, a 1994 survey conducted by three western universities indicated that the most important factor concerning the future of public lands was resources for future generations. The 1986 Governor's Task Force on Idahoans Outdoors found that the vast majority of respondents listed "preserving access to public lands for recreation use" as an outdoor recreation issue of great importance.

However, while there may be widespread interest in environmental and public land issues, there is often little agreement on how to resolve these issues, or what the outcome should be. As noted earlier in this discussion, while some believe National Forest timber harvest provides high-paying employment and sustainable family incomes, others argue that timber harvest creates environmental degradation, and that economic and population growth in the Northwest is and should be tied to natural landscapes and environmental features. Others see many environmental issues tied to what is perhaps a more fundamental issue—whether or not state and county officials should dictate the uses of public lands within a state.

With changing demographics and economies in many parts of the Ecogroup area, county commissioners and mayors articulate the shifts and challenges their communities face. At the same time, many are proud of their counties, communities and surroundings, and want to retain viable communities for the future. Many cite a commitment of community members to help each other. Many also express a desire to continue a "multiple-use" way of life, while recognizing that economic diversity and economic development is necessary.

Social Organization

Information about social organization in the Ecogroup area was drawn from this section's earlier discussions regarding ICBEMP, as well as county commissioner and mayor interviews.

A previous part of this discussion includes "resilience ratings" for counties and communities, as evaluated by the ICBEMP, for many counties and communities within the Ecogroup area. According to ICBEMP studies, some counties may show low or moderate economic and socio-economic resilience, while small communities within these counties have moderately high or high community resilience (for example, Cascade in Valley County).

At the same time, counties and communities note the effect of recent growth and change, citing less free exchange of ideas, and less time with neighbors and friends (and more time at meetings). In some urban-adjacent areas, such as Boise County or the Fairfield area, small towns have become "bedroom communities," providing more affordable housing for urban workers, or providing increased services for part-time residents and visitors.

Also noted was a "ripple effect" in communities of recent economic and social changes. For example, in Fairfield, the 1980 closure of a local sawmill directly or indirectly affected the railroad, the dairy industry, and an increase in the size and specialization of farms. In many counties, declining 25 percent funds have resulted in fewer funds available for schools and roads, especially because an alternative source of funding, property tax, is subject to an annual 3 percent cap on increases.

Several commissioners feel that there are changes in the way public-land decisions are made, believing that local land managers have less authority and management discretion than they have in the past, and that decisions are now made or strongly influenced by upper levels of the Forest Service, and/or regulatory agencies, environmental groups, and the courts.

Land-Use Patterns

Information about land-use patterns in the Ecogroup area was drawn from this section's earlier discussions regarding ICBEMP, as well as county population changes, and statistics regarding county land ownership.

The ICBEMP noted that within the Interior Columbia River Basin (including the Southwest Idaho Ecogroup), the region followed the national trend, with the bulk of recent growth occurring at the urban centers. In 10 of the Ecogroup area counties, more than 50 percent of their land is owned by the federal government, and in seven of 17 counties, more than 70 percent of the land is in federal ownership.

Civil Rights

Information about civil rights in the Ecogroup area was drawn from this section's earlier discussions of state and county demographics, as well as personal contacts.

Although Idaho and the Ecogroup area remain largely white and Anglo-Saxon, the state is becoming racially more diverse. Hispanics comprise 6.8 percent of the state's population, but the Hispanic population increased by about 50 percent from 1990 to 1996. Canyon County, which lies within the Ecogroup socioeconomic overview area, includes 25 percent of Idaho's Hispanic population. Although few data are available, there is a sense that the state's Hispanics use and relate to National Forests in ways similar to Idaho's predominantly white population.

ENVIRONMENTAL CONSEQUENCES

As noted earlier, eight indicators have been selected to measure the effects of the Forest Plan Revision alternatives on the social and economic environment. These indicators correspond to variables identified in Forest Service Manual (FSM) 1972.1 and 1973.2, and Forest Service Handbook (FSH) 1909.17, for social and economic analysis. They include population; employment; income; lifestyles; social organization; land-use patterns; attitudes, beliefs and values; and civil rights.

For the population indicator, estimated figures are reported for the 17 counties described in the "Current Condition" section of this chapter. For the employment and income indicators, estimated figures are reported for 17 of the 19 communities studied in depth, again under each alternative. Employment and income were not reported for the Treasure Valley and Twin Falls, because these urban communities generally have social, rather than direct economic, ties to the Ecogroup National Forests.

For three of the indicators (lifestyles, social organization, land-use patterns), the discussion is organized to reflect three groups of the 19 communities described earlier. These groups include two urban communities (the Treasure Valley and Twin Falls), urban-adjacent communities (McCall-Donnelly, Ketchum-Sun Valley, Hailey-Bellevue, Idaho City, Crouch-Garden Valley, Emmett and Cascade), and rural communities (Gooding, New Meadows, Council, Riggins, Fairfield, Challis, Stanley, Oakley Valley, Raft River Valley and Weiser).

Community groups were developed based largely on two factors: population, and location in an urban, urban-adjacent or rural county. For the purposes of the socio-economic overview and this discussion, an urban community has more than 3,000 residents. An urban-adjacent community is typically located in an urban-adjacent county, with populations near or above 1,000 residents. Rural communities typically are located in rural counties, with populations below 1,000 people. There are some exceptions: Riggins, the Oakley Valley and Raft River Valley all lie within counties that are adjacent to urban areas, but these communities were placed in the rural group to reflect their relatively small size and somewhat isolated location. By contrast, McCall-Donnelly and Cascade lie within a rural county, but they were placed in the urban-adjacent group to reflect their proximity to State Highway 55, a major north-south route from the Treasure Valley.

For the remaining two indicators (attitudes, beliefs and values; and civil rights), the discussion is organized to reflect the Ecogroup area counties and communities as a whole. The "Ecogroup as a whole" was selected as the unit of measure because there is no specific data for which these indicators could be evaluated by community, or groups of communities.

Population

Table SO-3, included in the "Current Conditions" portion of this section, shows population figures for each of the 17 counties projected for the years 2010, and 2020. These population figures are not expected to vary by alternative. This population information is summarized from the 1999 *Affected Economic Environment and Baseline for the No-Action Alternative*, developed by EMSI for the Forest Plan Revision process, and updated in 2002. This document is available in the planning record.

Table SO-3 lists historic population estimates (1970 to 2000) for the 17 counties, along with the median of two sets of population projections, from now until the year 2020. Historic population estimates are derived from the U.S. Department of Commerce, Regional Economic Information System. In developing the median population projection, the first set of projections used are those established by the ICBEMP, which assumed that jobs follow population (and populations are attracted according to the level of natural amenities). The second set of projections were developed by Idaho Power, a standard source for population and economic projections in Idaho (Robison and Gneiting1999). The Idaho Power projections are assembled using the traditional assumption: population follows jobs, and jobs follow economic opportunity (Robison and Gneiting 1999).

Lifestyles

Urban Communities - Under all alternatives, urban communities would be expected to continue to grow, with newcomers originating both from within and outside Idaho. In these areas, an increasing share of the economies would continue to be tied not to resource-related employment, but to the burgeoning high-tech industry and other sectors. Growth in the diversity of people and their recreation preferences would be expected to continue. It is likely that the urban communities would continue to look to the Ecogroup National Forests to provide an increased need and desire for recreational areas and undeveloped areas, under any alternative.

Urban-Adjacent Communities - Under Alternatives 1B, 2, 3, and 7, urban-adjacent communities would likely continue to experience the effects of growth and change. Areas such as Boise County or the community of Fairfield would likely continue to function in part as "bedroom communities," providing more affordable housing for urban workers, or providing increased services for part-time residents and visitors. Because these alternatives would allow for more commodity production than Alternatives 4 or 6, Alternatives 1B, 2, 3 and 7 would also allow a mix of lifestyles in these communities that would include millworkers and ranchers as well as part-time residents and commuters.

Under Alternatives 4 and 6, opportunities for mill worker and/or ranching lifestyles would be less than under Alternatives 1B, 2, 3 and 7. However, Alternatives 4 and 6 might enhance the attractiveness of urban-adjacent communities for some commuters, because these alternatives would include reduced levels of human activities in forest and grassland settings. Under Alternative 5, opportunities for mill worker and/or ranching lifestyles would be greater than under any other alternative.

Rural Communities - Under Alternatives 1B, 2, 3 and 7, rural communities would likely continue to provide some opportunities for mill worker and ranching lifestyles; however, these communities would also likely continue to look for opportunities to diversify their economies. Under Alternatives 4 and 6, there would be reduced opportunities for mill worker and ranching lifestyles. Because these communities are generally more isolated than urban or urban-adjacent communities, mill worker and ranching lifestyles may or may not be replaced by those of recreationists, telecommuters or part-time residents, depending in part on the level of future advances in technology and transportation. In addition, Alternatives 4 and 7, with their relatively large program of prescribed fire and wildland fire use for resource benefits, may provide increased opportunities for seasonal firefighting lifestyles, and, at the same time, may produce increased smoke, which may be undesirable to residents and visitors. Under Alternative 5, rural communities would likely provide greater opportunities for mill worker and ranching lifestyles than under any other alternative.

Social Organization

Urban Communities - As noted in the Current Conditions section, Ada, Canyon and Twin Falls Counties, which contain the urban communities of the Treasure Valley and Twin Falls, respectively, are considered by the ICBEMP to have a high level of socio-economic resiliency, with low or moderate timber/forage importance. Consequently, no change in the social organization of the urban communities would be expected under any alternative.

Urban-Adjacent Communities - As noted in the Current Conditions section, the urban-adjacent communities within the Ecogroup exhibit a range of socio-economic resiliency ratings, with many depicted as having a "high" level of resilience. Under Alternatives 1B, 2, 3 and 7, urban-adjacent communities would likely continue to experience the effects of growth and change, and some may continue to function in part as "bedroom communities." As noted in the interviews with county commissioners and mayors, these changes may include less free exchange of ideas, and less time with neighbors and friends. However, given the high socio-economic resilience of many of these communities, they might be able to accommodate and resolve potential conflicts more quickly than other communities. Under Alternatives 4 and 6, social organization in urban-adjacent communities could shift to patterns associated with commuters, more than under the other alternatives. Under Alternative 5, urban-adjacent communities would likely retain a social organization centering around commodity-based lifestyles, while accommodating those lifestyles associated with commuters, part-time residents, and recreationists.

Rural Communities - As noted in the Current Conditions section, rural communities within the Ecogroup also exhibit a range of socioeconomic resiliency ratings. However, the March 2000 ICBEMP SDEIS recognized that small rural communities were of particular focus, finding that these communities were, as a whole, more subject to potential effects from external forces such as changing technology, population fluxes, and changes in historical land use policies, including those currently underway in the Forest Service.

Under Alternatives 1B, 5 and 7, rural communities would likely retain a social organization centering around commodity-based lifestyles. Under the remaining alternatives, social organization would likely be centered around commodity-based lifestyles to a lesser extent. Under Alternatives 4 and 7, however, there may opportunities for seasonal, fire-related lifestyles, given the emphasis on prescribed fire and prescribed natural fire under this alternative. Alternatives 4 and 6 (and to a lesser extent 2, 3 and 7) provide opportunities for community social organizations that revolve around (or extensively incorporate) nonmotorized and motorized recreation, perhaps more than commodity-based lifestyles.

Land Use Patterns

Urban Communities - The ICBEMP noted that within the Interior Columbia River Basin (including the Ecogroup area), the region followed the national trend, with the bulk of recent growth occurring at the urban centers. Within Idaho, urban areas are expected to grow faster than rural areas. Since these areas contain less National Forest land than urban-adjacent or rural areas, this growth pattern would be expected to continue regardless of alternative.

Urban-Adjacent Communities - As noted in the Current Conditions section, urban-adjacent areas have grown more than rural areas, but less so than urban areas. Blaine, Boise, Elmore, and Valley Counties encompass the urban-adjacent communities (McCall-Donnelly, Ketchum-Sun Valley, Hailey-Bellevue, Idaho City, Crouch-Garden Valley, Emmett and Cascade), and each of these counties have 70 percent or more of their land base in federal management.

Under Alternatives 1B, 2 and 3, urban-adjacent communities would likely continue to experience the effects of growth and change while retaining some commodity-based economy, and some may continue to function in part as “bedroom communities.” This may result in new home construction scattered or clustered on private land throughout the county, changing land use patterns from rural to those more typically associated with wildland interface.

Under Alternatives 4 and 6, the extent of wildland interface may increase, if commuters and part-time residents are attracted in particular by the nonmotorized and/or roadless opportunities presented by these alternatives. Under Alternative 5, the urban-adjacent communities would likely see an increase in a commodity-based economy, perhaps making local surroundings less attractive for commuters and part-time residents, with less change in land use patterns. Under Alternative 7, there may be an increase in a commodity-based economy as restoration activities occur; although these activities might produce some short-term conditions that are less attractive to part-time residents and commuters, in the long term these activities might result in a forest landscape, sought by many residents, that is less susceptible to uncharacteristic fires or insect/disease events.

Rural Communities - As noted in the Current Conditions secton, rural areas within the Ecogroup area are expected to grow only slightly over the next few decades. Like the urban-adjacent areas, many of the rural areas encompass large areas of federally-managed land. Under Alternatives 1B, 2 and 3, land use patterns would likely remain the same, with a mix of managed and unmanaged land. Under Alternative 5, there would likely continue to be a mix of managed and unmanaged land, with a greater percentage of managed land than under the remaining alternatives. Under Alternatives 4, 6 and 7, there might be some shift to wildland interface areas as new residents, attracted to nonmotorized recreation and/or roadless features, move in. However, despite the increase in locationally independent lifestyles such as telecommuting or entrepreneuring, it has been difficult to discern anything like a rural renaissance in Idaho.

Attitudes, Beliefs and Values

Under all alternatives, Ecogroup area counties and communities would likely continue to exhibit widespread interest in natural resources and public land issues, as well as diversity in attitudes, beliefs, and values about these resources and issues. Although many counties and communities have faced, and will likely continue to face shifts and challenges, many are proud of their communities, counties and surroundings, and want to retain viable communities for the future.

Civil Rights

Under all alternatives, it is likely that Idaho and the Ecogroup area will become racially more diverse (particularly in terms of Hispanic population increase), while remaining largely white and Anglo-Saxon. Although few data are available, there is a sense that the state's Hispanics use and relate to National Forests in ways similar to Idaho's predominantly white population, and that this relationship would likely continue regardless of the Forest Plan alternative selected.

Employment and Income

Differences across Forest Service management alternatives are reflected in differences in Forest outputs. Three broad output types are considered: timber, range, and recreation. Community economies in the vicinity of Forest Service lands are in varying degrees dependent on these outputs. This discussion includes estimates of the impact of Forest Service management alternatives on the jobs and incomes of nearby communities. The need to assess community economic impacts is spelled out in Forest Planning regulations (40 CFR 1502.15 and 36 CFR 219.11(a) and 219.12(e)), and relevant portions of the Forest Service Handbook.

Timelines in Forest Planning vary, depending on what Forest Service outputs are tracked, and why they are projected. Timber inventory, for example, responds to management directions in ways that can be predicted several decades into the future. On the other hand, recreation projections for as short a time frame as five or 10 years require substantial conjecture regarding such variables as population movements and the public's taste for outdoor recreation.

Timeline for Reporting Economic Impacts

The timeline for projecting baseline economic activity is rather short as well. Accordingly, in consultation with Forest Planning staff, it was decided to estimate community-level economic impacts for the first decade only, and to report these impacts at five-year intervals. Thus, community jobs and earnings are reported for 2000, 2005, and 2010. In the case of 2000, a single set of observations estimate current values. For 2005 and 2010 several estimates of job and earnings are displayed, specifically, one set for each of the management alternatives.

Community-Level Economic Impact Models

To estimate Forest Service management actions on community jobs and incomes, an economic impact model for each of the Forest Service-affected communities was constructed. Aside from tracking data shown in the community economic profiles in the Affected Environment section, the impact models provide for the estimation of "economic multiplier effects." Multiplier effects are well recognized in the regional economic literature. They occur when output changes in one sector (e.g., sawmills or restaurants) lead to changes in the outputs of other sectors. These associated changes occur through changes in business purchases, and through changes in consumer spending of affected workers.

In general, the community-level impact models used in the analyses presented in this report were constructed according to procedures documented in the journal article: "Community Input-Output Models for Rural Area Analysis: with an Example from Central Idaho," *Annals of Regional Science,* 31(3), 325-351.

Forest Service offices and operations are an important source of jobs and earnings in many rural communities, including several of those in this FEIS. An accounting of Forest Service jobs at communities has been completed, and while numbers are included in the "Federal Government" sector of the community economic models (see community economic profiles includes in the Affected Environment section). Their specific impact in community economies, and change across alternatives, has been estimated in the analysis completed for the FEIS.

The alternatives also project varying degrees of forest restoration. These include removal of brush and undergrowth, thinning, road reconstruction and/or obliteration, and a variety of other activities aimed at changing the condition of the forest and improving forest and ecosystem health. These activities involve equipment and labor (often involving the logging and/or road construction sectors directly), and they can provide a substantial boost to rural economies, especially where there are job and earnings losses due to Forest Service output reductions elsewhere. Although the specific impact of restoration activities was not estimated in the economic analysis completed for this FEIS, the ICBEMP SDEIS analysis estimated that the number of full-time forestry workers required for precommercial thinning was based on one job per $43,125 of expenditures. This ratio was then converted to one job per 500 acres based on per-acre thinning costs. Range restoration jobs were also based on one job per $43,125 of expenditures (ICBEMP 2000a). Using the ICBEMP formula, if an alternative has, for example, 8,070 acres of precommercial thinning over a decade,[9] an estimated 16 full-time jobs could be created over that 10-year period, at a cost of nearly $690,000.

The Impact of Forest Service Range Management on Local Economies

Forest Service livestock summer range supports jobs and incomes in community economies. Beyond jobs in the livestock sector, range supports additional jobs in community economies through the action of multiplier effects discussed in the previous section. These multiplier effects are estimated with the aid of the community economic impact models.

Data showing livestock grazing allotments and the location of permittees were obtained from Forest Service Range staff. It is assumed that summer range size, and suitability or capability is a limiting factor in sheep and cattle herd size and grazing season. In other words, it is assumed that there are no practical substitutes for summer range, and any reductions in summer grazing allotments are directly met by corresponding reductions in herd size and/or use and livestock sector employment. For modeling purposes, numbers of head months were estimated for each alternative to allow for a basis of comparison. That is not to say that these are to be the exact

[9] A total of 8,070 acres of precommercial thinning for the first decade of the planning horizon is indicated for the Boise NF for Management Prescription Category 5, Alternative 3, in Table B-27, Appendix B, to this FEIS.

numbers grazed under implementation of the alternative. Actual numbers of livestock grazed is a decision made outside the scope of Forest Plan revision. Specific details on the livestock sector modeling approach are found in the Forest Planning process record paper *An Estimate of Cattle and Sheep Ranch Employment Dependent on the Boise, Payette, and Sawtooth National Forests* (Robison and Peterson 1999).

The Overall Role of Permitted Livestock Grazing on National Forest Lands in Community Economies - Tables SO-8 and SO-9 show the role of Forest Service livestock grazing in Forest Service-affected community economies. The tables were constructed to show total jobs and earnings, respectively, attributed to Forest Service livestock grazing at the levels indicated by current management. In the case of livestock grazing, current management direction is represented in Alternative 1B, the No Action alternative. The tables indicate the relative role of Forest Service range in local economies, and provide some indication as to the magnitude of potential range management impacts.

The tables are divided into three panels, one for the current year, 2000, which will be viewed as roughly representative of the current condition, and one each for the two projection years 2005 and 2010. The "total jobs" column in Table SO-8 shows the total of all jobs at communities; these correspond to the same shown in the selected community economic profiles shown in the Affected Environment section. Similarly, the "total earnings" column in Table SO-9 shows the total of all earnings at communities; again, these correspond to the same shown in the community economic profiles. The second columns in each table show jobs and earnings at communities directly or indirectly linked to permitted grazing. Direct jobs are those in the livestock sectors, and are included among the agriculture sector jobs in community and income economic profiles. Indirect jobs and earnings refer to jobs and earnings in other sectors, i.e., jobs and earnings explained by the action of the community economic multiplier. The percentage columns show Forest Service range-linked jobs and earnings as a percent of total jobs and earnings: a measure of the importance of Forest Service range in community economies. Of the communities displayed here, Raft River Valley (Elba, Malta, and Almo) is the most dependent on Forest Service grazing in both relative and absolute terms, with 54 jobs, equivalent to 8 percent of all jobs in the community.

The rows in Tables SO-8 and SO-9 labeled "Total" show the jobs and earnings created by range at the 17 Forest Service affected communities shown here. In 2000, the Forest Service range created a total of 286 jobs (less than 1 percent of all jobs at the 17 communities) and $7.6 million in earnings (less than 1 percent of all earnings at the 17 communities).

The Impact of Forest Service Range Management Alternatives - Tables SO-10 through SO-17 show total jobs and earnings linked to Forest Service grazing permits given a continuation of current management practice, the allotment levels projected by the No Action alternative, for the years 2005 and 2010. These tables also show changes in jobs and earnings and as a result of allotment changes as projected by alternatives. For example, Table SO-10 indicates that in 2005, relative to the No Action (continue current management and direction) alternative, implementation of Alternative 2 would result in a loss of 3 jobs at Council (a negative 8.8 percent decrease from jobs currently linked to Forest Service range of all jobs), 1 job at Riggins (a negative 8.1 percent reduction in Forest Service-linked of all jobs), and so on. All in all, and focusing on 2005, implementation of range management policies indicated in Alternative 2 would result in 10 fewer jobs at the Forest Service-affected communities shown in Table SO-10.

As shown in Tables SO-10 through SO-17, all action alternatives result in grazing reductions, and corresponding reductions in jobs at communities. Moreover, from 2005 to 2010 the loss of grazing and grazing-linked jobs generally increases. Alternative 4 indicates the greatest increase in losses. By 2010, implementation of Alternative 4 would result in a loss of 33 jobs among the communities displayed here.

Tables SO-10 through SO-17 indicate that range-linked jobs and earnings tend to decline under all alternatives in 2005 and 2010. Alternative 7 has the greatest impact in 2005, with a total loss for all 17 communities combined of 22 jobs. This contrasts with Alternative 5, which indicates a total job loss of 9 jobs among the 17 communities. By 2010, there is some shifting of job loss by alternative. Alternative 4 shows the most overall job losses, 33 across all the communities.

Table SO-8. Jobs Created by Forest Service Range in Community Economies: Jobs Linked to Forest Service Range Management Under the Current Situation

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Jobs	Range-Linked Jobs	% Of Total	Total Jobs	Range-Linked Jobs	% Of Total	Total Jobs	Range-Linked Jobs	% Of Total
Cascade	878	0	0.0	961	0	0.0	1,038	0	0.0
Challis	1,220	8	0.7	1,278	7	0.6	1,350	8	0.6
Council	1,103	41	3.7	1,164	37	3.2	1,230	41	3.3
Crouch-Garden Valley	632	0	0.0	690	0	0.0	751	0	0.0
Emmett	5,366	28	0.5	5,654	27	0.5	5,952	26	0.4
Fairfield	642	0	0.0	701	0	0.0	757	0	0.0
Gooding	3,338	98	2.9	3,615	90	2.5	3,875	94	2.4
Hailey-Bellevue	4,607	0	0.0	5,074	0	0.0	5,533	0	0.0
Idaho City	724	0	0.0	801	0	0.0	882	0	0.0
Ketchum-Sun Valley	10,812	0	0.0	12,219	0	0.0	13,665	0	0.0
McCall-Donnelly	4,403	2	0.0	4,811	2	0.0	5,253	0	0.0
New Meadows	679	4	0.6	711	3	0.5	741	4	0.5
Oakley Valley	421	11	2.7	449	11	2.5	474	11	2.3
Raft River Valley	643	54	8.4	688	53	7.7	721	53	7.4
Riggins	643	13	2.1	696	12	1.8	742	13	1.8
Stanley	256	0	0.0	288	0	0.0	318	0	0.0
Weiser	4,333	27	0.6	4,566	26	0.6	4,811	27	0.6
TOTAL	**40,700**	**286**	**0.7**	**44,368**	**270**	**0.6**	**48,093**	**279**	**0.6**

Note: All job numbers are rounded to the nearest whole number, and all percentages are rounded to the nearest tenth of a percent.

Table SO-9. Earnings Created by Forest Service Range in Community Economies: Earnings Linked to Forest Service Range Under the Current Situation

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Earnings ($1,000)	Range-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Range-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Range-Linked Earnings ($1,000)	% of Total
Cascade	18,645	0	0.0	21,700	0	0.0	24,828	0	0.0
Challis	31,521	165	0.5	34,661	151	0.4	37,790	165	0.4
Council	29,042	824	2.8	31,796	757	2.4	34,696	824	2.4
Crouch-Garden Valley	13,073	0	0.0	14,929	0	0.0	16,952	0	0.0
Emmett	107,958	483	0.4	118,349	462	0.4	129,606	455	0.4
Fairfield	14,216	0	0.0	15,733	0	0.0	17,316	0	0.0
Gooding	87,746	2,944	3.4	97,995	2,706	2.8	108,305	2,813	2.6
Hailey-Bellevue	134,468	0	0.0	155,270	0	0.0	177,156	0	0.0
Idaho City	14,016	0	0.0	16,204	0	0.0	18,602	0	0.0
Ketchum-Sun Valley	293,896	0	0.0	348,552	0	0.0	408,713	0	0.0
McCall-Donnelly	88,461	41	0.0	102,309	37	0.0	116,730	41	0.0
New Meadows	24,494	84	0.3	26,380	72	0.3	28,267	84	0.3
Oakley Valley	12,871	392	3.0	14,135	392	2.8	15,394	379	2.5
Raft River Valley	23,237	2,009	8.6	25,297	1,986	7.9	27,196	1,976	7.3
Riggins	13,296	280	2.1	14,918	259	1.7	16,509	280	1.7
Stanley	4,538	0	0.0	5,246	0	0.0	5,977	0	0.0
Weiser	78,802	418	0.5	86,665	412	0.5	95,180	418	0.4
TOTAL	**990,279**	**7,640**	**0.8**	**1,130,140**	**7,234**	**0.6**	**1,279,216**	**7,434**	**0.6**

Table SO-10. Forest Service Range-Linked Jobs Indicated by Alternative: 2005

Communities	Current Situation		Change In Total Jobs**						
	Total Jobs	FS Range-Linked Jobs*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	961	0	0	0	0	0	0	0	0
Challis	1,278	7	0	-1	-1	-1	0	-1	-1
Council	1,164	37	0	-3	-2	-2	-3	-5	-5
Crouch-Garden V.	690	0	0	0	0	0	0	0	0
Emmett	5,654	27	0	-0	-1	-2	-0	-1	-2
Fairfield	701	0	0	0	0	0	0	0	0
Gooding	3,615	90	0	-3	-2	-2	-3	-5	-5
Hailey-Bellevue	5,074	0	0	0	0	0	0	0	0
Idaho City	801	0	0	0	0	0	0	0	0
Ketchum-Sun V.	12,219	0	0	0	0	0	0	0	0
McCall-Donnelly	4,811	2	0	-0	0	0	-0	-0	-0
New Meadows	711	3	0	-1	-1	-1	-1	-1	-1
Oakley Valley	449	11	0	0	0	-1	0	-1	-1
Raft River Valley	688	53	0	-0	-0	-1	0	-7	-7
Riggins	696	12	0	-1	-1	-1	-1	-1	-1
Stanley	288	0	0	0	0	0	0	0	0
Weiser	4,566	26	0	0	0	0	0	0	0
TOTAL	**44,368**	**270**	**0**	**-10**	**-8**	**-11**	**-9**	**-20**	**-22**

*Jobs linked to Range management on Forest Service administered lands.
**Change in total range-related jobs, including those linked to range management on National Forest *and* non-National Forest lands.
Note: All job numbers are rounded to the nearest whole number.

Table SO-11. Percent Change in Range-Linked Jobs Indicated by Alternative: 2005

Communities	Percent Change In Total Jobs Compared to FS Range-Linked Jobs*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Challis	0.0	-8.6	-8.6	-8.6	0	-8.6	-9.0
Council	0.0	-8.8	-6.2	-6.2	-8.8	-13.0	-13.5
Crouch-Garden Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emmett	0.0	-1.4	-4.0	-8.3	-1.4	-2.9	-6.8
Fairfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gooding	0.0	-3.5	-2.6	-2.6	-3.6	-5.3	-5.6
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ketchum-Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	0.0	-11.1	0.0	0.0	-11.1	-11.1	-11.1
New Meadows	0.0	-16.9	-16.9	-16.9	-16.9	-16.9	-17.7
Oakley Valley	0.0	0.0	0.0	-4.6	0.0	-7.7	-8.1
Raft River Valley	0.0	-0.8	-0.3	-2.5	0.0	-12.3	-12.9
Riggins	0.0	-8.1	-8.1	-8.1	-8.1	-8.1	-8.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.0**	**-3.6**	**-3.0**	**-4.1**	**-3.2**	**-7.5**	**-8.2**

*The percent change reflects the change in total jobs for alternatives as compared to the FS range-linked jobs in Table SO-10.
Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-12. Forest Service Range-Linked Earnings Indicated by Alternative: 2005

Communities	Current Situation		Change in Total Earnings ($1,000)						
	Total Earnings ($1,000)	FS Range-Linked Earnings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	21,700	0	0	0	0	0	0	0	0
Challis	34,661	151	0	-15	-15	-15	0	-15	-15
Council	31,796	757	0	-68	-48	-48	-68	-101	-105
Crouch-Garden V.	14,929	0	0	0	0	0	0	0	0
Emmett	118,349	462	0	-7	-20	-41	-7	-14	-16
Fairfield	15,733	0	0	0	0	0	0	0	0
Gooding	97,995	2,706	0	-68	-48	-48	-68	-101	-105
Hailey-Bellevue	155,270	0	0	0	0	0	0	0	0
Idaho City	16,204	0	0	0	0	0	0	0	0
Ketchum-Sun V.	348,552	0	0	0	0	0	0	0	0
McCall-Donnelly	102,309	37	0	-4	0	0	-4	-4	-4
New Meadows	26,380	72	0	-12	-12	-12	-12	-12	-13
Oakley Valley	14,135	392	0	0	0	-15	0	-26	-27
Raft River Valley	25,297	1,986	0	-15	-5	-47	0	-226	-236
Riggins	14,918	259	0	-21	-21	-21	-21	-21	-22
Stanley	5,246	0	0	0	0	0	0	0	0
Weiser	86,665	412	0	-8	-8	-8	-7	-9	-9
TOTAL	**1,130,140**	**7,234**	**0**	**-211**	**-170**	**-248**	**-181**	**-519**	**-544**

Note: All earnings numbers are expressed in thousands of dollars and rounded to the nearest thousand.

Table SO-13. Percent Change in Range-Linked Earnings Indicated by Alternative: 2005

Communities	Percent Change In Total Earnings Compared to FS Range-Linked Earnings*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Challis	0.0	-9.7	-9.7	-9.7	0.0	-9.7	-10.1
Council	0.0	-9.0	-6.4	-6.4	-9.0	-13.3	-13.9
Crouch-Garden Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emmett	0.0	-1.6	-4.3	-8.9	-1.6	-3.1	-3.5
Fairfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gooding	0.0	-2.5	-1.8	-1.8	-2.5	-3.7	-3.9
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ketchum-Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	0.0	-9.7	0.0	0.0	-9.7	-9.7	-10.1
New Meadows	0.0	-17.4	-17.4	-17.4	-17.4	-17.4	-18.1
Oakley Valley	0.0	0.0	0.0	-3.9	0.0	-6.6	-6.9
Raft River Valley	0.0	-0.7	-0.2	-2.3	0.0	-11.4	-11.9
Riggins	0.0	-8.2	-8.2	-8.2	-8.2	-8.2	-8.6
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	-1.8	-1.9	-1.9	-1.7	-2.2	-2.3
TOTAL	**0.0**	**-2.9**	**-2.3**	**-3.4**	**-2.5**	**-7.2**	**-7.5**

*The percent change reflects the change in total earnings for alternatives as compared to the FS range-linked earnings in Table SO-12. Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-14. Forest Service Range-Linked Jobs Indicated by Alternative: 2010

Communities	Current Situation		Change In Total Jobs**						
	Total Jobs	FS Range-Linked Jobs*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	1,038	0	0	0	0	0	0	0	0
Challis	1,350	8	0	-1	-1	-1	0	-1	-1
Council	1,230	41	0	-5	-5	-5	-5	-8	-8
Crouch-Garden V.	751	0	0	0	0	0	0	0	0
Emmett	5,952	26	0	-1	-2	-3	-1	-1	-2
Fairfield	757	0	0	0	0	0	0	0	0
Gooding	3,875	94	0	-9	-10	-17	1	-6	-6
Hailey-Bellevue	5,533	0	0	0	0	0	0	0	0
Idaho City	882	0	0	0	0	0	0	0	0
Ketchum-Sun V.	13,665	0	0	0	0	0	0	0	0
McCall-Donnelly	5,253	2	0	-0	-0	-0	-0	-0	-0
New Meadows	741	4	0	-1	-1	-1	-1	-1	-1
Oakley Valley	474	11	0	0	-0	-1	0	0	-0
Raft River Valley	721	53	0	-1	-0	-3	1	0	0
Riggins	742	13	0	-2	-2	-2	-2	-2	-2
Stanley	318	0	0	0	0	0	0	0	0
Weiser	4,811	27	0	-2	-2	-2	-2	-2	-2
TOTAL	**48,093**	**279**	**0**	**-20**	**-22**	**-33**	**-8**	**-20**	**-22**

*Jobs linked to Range management on Forest Service administered lands.
**Change in total range-related jobs, including those linked to range management on National Forest *and* non-National Forest lands.
Note: All job numbers are rounded to the nearest whole number.

Table SO-15. Percent Change in Range-Linked Jobs Indicated by Alternative: 2010

Communities	Percent Change In Total Jobs Compared to FS Range-Linked Jobs*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Challis	0.0	-18.0	-18.0	-18.0	0.0	-18.0	-18.0
Council	0.0	-13.1	-12.6	-12.6	-13.1	-18.8	-19.7
Crouch-Garden Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emmett	0.0	-2.1	-6.5	-11.3	-2.7	-4.7	-8.7
Fairfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gooding	0.0	-9.9	-10.6	-18.1	1.1	-6.4	-6.7
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ketchum-Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	0.0	-15.0	-5.0	5.0	-15.0	-15.0	-15.7
New Meadows	0.0	-24.1	-24.1	-24.1	-24.1	-24.1	-25.2
Oakley Valley	0.0	0.0	-1.5	-6.6	0.0	-3.2	-3.3
Raft River Valley	0.0	-1.1	-0.8	-4.8	1.0	0.5	0.5
Riggins	0.0	-14.8	-14.8	-14.8	-14.8	-14.8	-15.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5
TOTAL	**0.0**	**-7.3**	**-7.9**	**-11.8**	**-2.8**	**-7.0**	**-7.7**

*The percent change reflects the change in total jobs for alternatives as compared to the FS range-linked jobs in Table SO-14.
Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-16. Forest Service Range-Linked Earnings Indicated by Alternative: 2010

Communities	Current Situation		Change in Total Earnings ($1,000)						
	Total Earnings ($1,000)	FS Range-Linked Earnings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	24,828	0	0	0	0	0	0	0	0
Challis	37,790	165	0	-33	-33	-33	0	-33	-35
Council	34,696	824	0	-111	-107	-107	-111	-159	-166
Crouch-Garden V.	16,952	0	0	0	0	0	0	0	0
Emmett	129,606	455	0	-10	-32	-55	-13	-23	-25
Fairfield	17,316	0	0	0	0	0	0	0	0
Gooding	108,305	2,813	0	-205	-215	-363	20	-142	-148
Hailey-Bellevue	177,156	0	0	0	0	0	0	0	0
Idaho City	18,602	0	0	0	0	0	0	0	0
Ketchum-Sun V.	408,713	0	0	0	0	0	0	0	0
McCall-Donnelly	116,730	41	0	-5	-2	-2	-5	-5	-6
New Meadows	28,267	84	0	-21	-21	-21	-21	-21	-22
Oakley Valley	15,394	0	0.0	0	-5	-21	0	-10	-11
Raft River Valley	27,196	1,976	0	-20	-15	-88	19	9	10
Riggins	16,509	280	0	-42	-42	-42	-42	-42	-44
Stanley	5.977	0	0	0	0	0	0	0	0
Weiser	95,180	418	0	-34	-35	-35	-33	-37	-38
TOTAL	**1,279,216**	**7,434**	**0**	**-447**	**-471**	**-733**	**-154**	**-426**	**-446**

Note: All earnings numbers are expressed in thousands of dollars and rounded to the nearest thousand.

Table SO-17. Percent Change in Range-Linked Earnings Indicated by Alternative: 2010

Communities	Percent Change In Total Earnings Compared to FS Range-Linked Earnings*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Challis	0.0	-20.1	-20.1	-20.1	0.0	-20.1	-21.0
Council	0.0	-13.4	-12.9	-12.9	-13.4	-19.3	-20.2
Crouch-Garden Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emmett	0.0	-2.2	-7.0	-12.2	-2.9	-5.1	-5.5
Fairfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gooding	0.0	-7.3	-7.6	-12.9	0.7	-5.0	-5.3
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ketchum-Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	0.0	-13.0	-4.3	-4.3	-13.0	-13.0	-13.6
New Meadows	0.0	-24.7	-24.7	-24.7	-24.7	-24.7	-25.9
Oakley Valley	0.0	0.0	-1.3	-5.6	0.0	-2.7	-2.9
Raft River Valley	0.0	-1.0	-0.8	-4.4	1.0	0.,5	0.5
Riggins	0.0	-15.1	-15.1	-15.1	-15.1	-15.1	-15.8
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	-8.2	-8.5	-8.5	-7.8	-8.8	-9.2
TOTAL	**0.0**	**-6.0**	**-6.3**	**-9.9**	**-2.1**	**-5.7**	**-6.0**

*The percent change reflects the change in total earnings for alternatives as compared to the FS range-linked earnings in Table SO-16. Note: All percentages are rounded to the nearest tenth of a percent.

The Impact of National Forest Recreation on Local Economies

National Forest recreational opportunities create jobs and earnings in local economies through the spending of recreation visitors. Forest Service recreation-linked jobs include more than simply jobs at gasoline stations, restaurants, motels, outfitters and guides, and trade outlets. Along with incomes generated in these directly impacted sectors, other sectors are affected through the action of the regional economic multiplier. These multiplier effects are estimated using the community-level economic impact models.

EMSI constructed a complex network model to estimate the role of Forest Service recreation in local economies. The model shows specific Forest Service recreation sites, the road network and communities through which recreationists' travel, and recreationists' spending along the way.[10] Table SO-18 shows the recreation data, in terms of Recreation Visitor Days (RVDs), for each of the three Forests. These data are summaries of more geographically detailed data, including information on Forest gateways, roads, or other entries that give access to the National Forest; and estimates of the Forest's total RVDs that pass through each of the gateways, including baseline estimates for 2000, and projections for 2005 and 2010 under current management direction (i.e., Alternative 1B, the No Action alternative).[11]

[10] Expenditure data were obtained from Alward et al., "Developing Expenditure Profiles for Forest Service Recreation Visitors," USDA Forest Service, Outdoor Recreation and Wilderness Assessment Research Group, Southeastern Forest Experiment Station, Athens, Georgia," DRAFT, no date.

[11] Disaggregation of total forest RVDs to specific gateways was a considerable task. For Payette National Forest, much of the work was completed by Jim Arp, PNF Recreation Specialist (now retired). For the other two forests, these spatial details had to be constructed from the bottom-up. The process started with extensive map research at EMSI, identifying forest entry and exit points, and key forest recreation sites. The numbers (and gateways) initially

The Overall Role of Forest Service Recreation in Community Economies - The current and projected recreation data summarized in Table SO-18 are fed into the road network and recreationist-spending model. This translates recreation levels by gateway to spending on trade, lodging, restaurants, etc., within affected communities. These expenditures are then fed into the economic impact model to yield the role of recreation in community economies.

Tables SO-19 and SO-20 show the role of Forest Service recreation in the 17 Forest Service-affected community economies, including figures for the current year (2000), and those projected given current management conditions (same as under Alternative 1B, the No Action alternative) for 2005 and 2010. The first columns show the total of all jobs or earnings in the communities. The second columns show jobs or earnings at communities directly or indirectly linked to recreation. Direct jobs are jobs in the traditional recreation-affected sectors, including gasoline stations, restaurants, motels, outfitters and guides, and trade outlets. Indirect jobs refer to jobs in other sectors explained by the action of community economic multiplier effects. The percentage columns show Forest Service recreation-linked jobs or earnings as a percent of total jobs or earnings, and they thereby provide a key measure of the importance of Forest Service recreation in community economies. Overall, Forest Service recreation accounts for between 6 and 7 percent of all jobs at the affected communities displayed here, for 2000, 2005 and 2010.[12]

The Impact of Forest Service Recreation Management Alternatives - For the purposes of the analysis, recreation levels were increased over time using population projections obtained from the ICBEMP and Idaho Power, as shown in the Current Conditions section. These projections were held constant across all alternatives with the assumption that Forest visitors would continue to use the National Forests regardless of the prescribed activities allowed under each alternative. The effects of implementing any alternative on recreation use are the same. Under all alternatives, recreation use, and recreation-associated jobs and earnings, increase over time. No changes from the current and projected levels shown in Tables SO-19 and SO-20 are anticipated, under any action alternative.

A comparison of percentages in Tables SO-15 and SO-16 shows that Forest Service recreation explains a larger percentage of jobs than earnings. This reflects the lower than average wages paid in the recreation sectors.

Table SO-18 shows that Forest Service RVDs are projected to increase over time. This projected growth in recreation use creates additional recreation-linked jobs in communities, and these appear in Tables SO-19 and SO-20. In particular, considering all 17 communities shown here, total Forest Service recreation-linked jobs go from 2,695 in 2000 to 2,847 in 2005 (average growth of 30 jobs per year). From 2005 to 2010, total Forest Service recreation-linked jobs go from 2,847 to 2,969 (an average growth of 24 jobs per year).

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assembled by EMSI researchers were later extensively revised by Forest Service recreation staff. Projections beyond 2000 where assembled by Jim Keller, BNF, and are otherwise documented in the forest planning record.

[12] Of the communities included in the planning record, individual recreation dependence ranges from nearly 80 percent for Stanley to less than 1 percent in the case of Oakley.

Table SO-18. RVD Projections for the Boise, Payette and Sawtooth NFs for 2000, 2005 and 2010

Forest	Historic RVDs	Projected RVDs		
	1997	2000	2005	2010
Boise	1,571,217	1,720,533	1,866,185	2,029,091
Payette	1,289,300	1,403,841	1,519,128	1,646,993
Sawtooth	2,071,514	2,219,302	2,393,731	2,584,933

Table SO-19. Jobs Created by Forest Service Recreation in Community Economies: Jobs Linked to Forest Service Recreation Under the Current Situation

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Jobs	Rec-Linked Jobs	% Of Total	Total Jobs	Rec-Linked Jobs	% Of Total	Total Jobs	Rec-Linked Jobs	% Of Total
Cascade	878	151	17.2	961	162	16.9	1,038	176	17.0
Challis	1,220	285	23.4	1,278	293	22.9	1,350	294	21.8
Council	1,103	33	2.9	1,164	36	3.1	1,230	39	3.2
Crouch-Garden Valley	632	216	34.2	690	243	35.2	751	245	32.6
Emmett	5,366	53	1.0	5,654	58	1.0	5,952	63	1.1
Fairfield	642	132	20.6	701	138	19.6	757	138	18.2
Gooding	3,338	48	1.4	3,615	49	1.4	3,875	50	1.3
Hailey-Bellevue	4,607	169	3.7	5,074	169	3.3	5,533	169	3.1
Idaho City	724	34	4.7	801	36	4.5	882	38	4.3
Ketchum-Sun Valley	10,812	495	4.6	12,219	503	4.1	13,665	503	3.7
McCall-Donnelly	4,403	601	13.7	4,811	660	13.7	5,253	718	13.7
New Meadows	679	61	9.0	711	64	9.0	741	69	9.4
Oakley Valley	421	2	0.5	449	2	0.5	474	2	0.5
Raft River Valley	643	9	1.4	688	9	1.3	721	9	1.2
Riggins	643	106	16.4	696	108	15.5	742	117	15.8
Stanley	256	206	80.5	288	216	74.9	318	230	72.1
Weiser	4,333	94	2.2	4,566	102	2.2	4,811	111	2.3
TOTAL	**40,700**	**2,695**	**6.6**	**44,366**	**2,847**	**6.4**	**48,093**	**2,969**	**6.2**

Note: All job numbers are rounded to the nearest whole number, and all percentages are rounded to the nearest tenth of a percent.

Table SO-20. Earnings Created by Forest Service Recreation in Community Economies: Earnings Linked to Forest Service Recreation Under the Current Situation

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Earnings ($1,000)	Rec-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Rec-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Rec-Linked Earnings ($1,000)	% of Total
Cascade	18,645	2,433	13.1	21,700	2,892	13.3	24,828	3,290	13.3
Challis	31,521	3,989	12.7	34,661	4,547	13.1	37,790	4,926	13.0
Council	29,042	417	1.4	31,796	476	1.5	34,696	522	1.5
Crouch-Garden V.	13,073	2,133	16.3	14,929	2,632	17.6	16,952	2,985	17.6
Emmett	107,958	663	0.6	118,349	789	0.7	129,606	861	0.7
Fairfield	14,216	1,008	7.1	15,733	1,192	7.6	17,316	1,312	7.6
Gooding	87,746	543	0.6	97,995	660	0.7	108,305	729	0.7
Hailey-Bellevue	134,468	4,025	3.0	155,270	5,208	3.4	177,156	5,942	3.4
Idaho City	14,016	449	3.2	16,204	516	3.2	18,602	592	3.2

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Earnings ($1,000)	Rec-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Rec-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Rec-Linked Earnings ($1,000)	% of Total
Ketchum-Sun Valley	293,896	9,970	3.4	348,552	13,564	3.9	408,713	15,905	3.9
McCall-Donnelly	88,641	9,305	10.5	102,309	11,757	11.5	116,730	13,523	11.6
New Meadows	24,494	776	3.2	26,380	893	3.4	28,267	963	3.4
Oakley Valley	12,871	33	0.3	14,135	40	0.3	15,394	43	0.3
Raft River Valley	23,237	118	0.5	25,297	144	0.6	27,196	154	0.6
Riggins	13,296	1,389	10.4	14,918	1,519	10.2	16,509	1,695	10.3
Stanley	4,538	3,680	81.1	5,246	3,993	76.1	5,977	4,399	73.6
Weiser	78,802	1,236	1.6	86,665	1,451	1.7	95,180	1,608	1.7
TOTAL	**990,279**	**42,168**	**4.3**	**1,130,140**	**52,271**	**4.6**	**1,279,216**	**59,450**	**4.6**

The Impact of Forest Timber Management on Local Economies

Southwest Idaho's wood products economy depends on log supply and product markets. When lumber markets are stable, sector employment and income is directly linked to log availability from public and private forests within a reasonable hauling distance. National forests have historically provided over 70 percent of regional harvests (McKetta 1999).

Forest Service management provides commercial timber as byproducts of two functions. Under "ecosystem management" concept, suitable timberlands are managed to provide sustainable levels of programmed timber harvest while achieving ecological goals, such as restoration of historical conditions. The byproduct of this management is the Allowable Sale Quantity (ASQ). On unsuited timberlands, commercial timber volume may be removed as salvage following insect/disease attack and/or wildfire, or as a byproduct of restoring healthy wildlife habitat or other conditions. The sum of programmed ASQ from suitable lands, and restoration or salvage volume from unsuitable lands, is the Total Sale Program Quantity (TSPQ). In this relatively isolated timber market, most National Forest logs are sold to local sawmills and manufactured by loggers located throughout the region. Logging and milling jobs have some of the highest incomes of rural Idaho communities.

Total log availability from all sources is the basis for projections of wood products activity. However, the relative magnitude of National Forest timber availability implies that changes in TSPQ are the most influential sources of changes in local forest economies. The SPECTRUM model projects TSPQ by alternative. TSPQ changes are then translated into direct employment and income effects by community. The direct effects are adjusted by trade patterns in an economic impact model to estimate the total job and income effects at the community level.

As noted earlier, alternatives also contain varying degrees of restoration practices that generate employment in addition to timber processing jobs. Such projects can offset Forest Service output reductions elsewhere and lessen impacts to rural economies by hiring logging and/or road construction labor directly. Some of this is already captured in the FEIS as a labor coefficient per MMBF of TSPQ timber sold, because smaller trees have become potentially merchantable.

The Role of National Forest Timber in Community Economies - The local timber market has changed rapidly. The DEIS timber market background study (McKetta 1999) found that several alternatives implied long-run primary wood products sector contraction. Meanwhile, administrative appeals, litigation, increased analysis requirements and other constraints made actual National Forest sales decline rapidly to volumes approximating the lowest timber alternatives instead of maintaining current operations. As a result, sector contractions accelerated, and mills closed quickly causing substantial negative rural community impacts.

The timber market environment for the Ecogroup forest planning changed substantially between the DEIS and the FEIS. There is only one remaining sawmill in southwest Idaho, as compared to three when the DEIS was published. Five of the seven FEIS alternatives now represent substantial potential expansions of national forest TSPQ timber volumes to well beyond that mill's capacity. Prioritization of ecosystem management treatments over more traditional timber sales implies that TSPQ logs will be a different species and size class mix than what was historically utilized.

A new Southwest Idaho timber market analysis (McKetta 2002) predicts that the five TSPQ expansion alternatives should cause substantial stumpage and log price declines in a locally uncompetitive and saturated log market. Increased national forest supplies of inexpensive logs could possibly lead to wood industry investment to expand capacity. The FEIS analysis makes outside estimates of the new milling technology, capacity and locations that would be necessary to consume all of the potential new log flows. However, high-risk timber availability could limit wood sector investment and actual expansionary impacts should be below the outside limit forecast.

Tables SO-21 and SO-22 show the role of only Forest Service timber in selected community economies, including multiplier effects estimated with the EMSI economic impact model. The table *does not* show the overall role of timber because total timber activity is proportionally reduced by the contributions from other non-Forest Service timber sources. Jobs created by Forest Service timber (SO-21) include only those jobs supported by National Forest timber management. This includes logging activities, sawmill jobs, and timber management by the Forest Service. The tables show community jobs and income attributed to Forest Service timber harvest at average 2000/2001 levels, and the number of timber-linked jobs remains steady throughout the planning period (2000-2010). However, the relative importance of timber in local economies decreases as the overall economy grows in each of the communities. For example in New Meadows, timber linked jobs remains steady at 117 jobs, but the percent of timber-linked jobs declines from 17.3 percent in 2000 to 15.8 percent in 2010. New Meadows is the most Forest Service timber-dependent community because it has the one surviving sawmill and a large concentration of loggers. In contrast, many communities (Challis, Gooding, Hailey-Bellevue, Oakley, Raft River, Stanley, Sun Valley, and Weiser) have no Forest Service timber-linked employment.

Table SO-22 presents the parallel picture to Table SO-21 in terms of earnings. Note that timber explains a greater share of earnings than jobs, a reflection of the higher than average wages paid in the timber sector.

Although the current status of the local economies is based on year 2000 reported data, the closures of Boise Cascade mills in 2001 have been factored in to approximate current economic conditions as they actually existed in 2002. There is a considerable difference between the actual

2002 availability of National Forest logs and the official TSPQ volumes of Alternative 1B (No Action). As a result, Tables SO-21 and SO-22 show jobs and incomes linked to timber given the current situation (i.e., approximate economic conditions in 2002). These values will appear as a baseline reference against which other alternatives, including the No Action alternative, are compared.

The Impact of Forest Service Timber Management Alternatives - Changes in Forest Service timber availability by alternative were fed into the EMSI community-level economic impact models. Tables SO-23 and SO-24 show the results of this impact analysis. The first column in SO-23 labeled "Timber-linked," repeats values from Tables SO-21 and SO-22, and thereby provides reference with jobs and earnings linked to National Forest timber under the current situation.

Alternative 1B, although the No Action alternative, would actually represent a significant increase in regional timber availability from a current local use of about 26 MMBF/ year to 120 MMBF/year. This alternative has a total effect on the communities modeled of 1,000 new jobs (Table SO-23). This would represent a net change in Forest Service timber-linked employment of 352.7 percent (Table SO-24). The major impacts would occur in Cascade, Emmett, Council, Crouch, Garden Valley, Idaho City, McCall-Donnelly, New Meadows, and Riggins. The largest job creation would occur in Emmett, showing an increase of 458 jobs, which is a change in Forest Service based employment of 1223.5 percent. McCall-Donnelly also has a large change with 107 new jobs or 1005.6 percent. Tables SO-25 and SO-26 show impacts in 2010. There are no changes in overall employment and earnings impacts from 2005-2010.

Relative to the current situation, represented by the No Action alternative (1B), Alternative 2 (the proposed action) would entail a modest expansion of about 60 MMBF/year over current flows in Forest Service timber availability. As shown in Table SO-23, Alternative 2 in 2005 would result in 605 additional jobs compared to Forest Service-linked jobs under the current situation. The impacts would be most significant in Cascade (173 new jobs) and New Meadows (159 new jobs). Table SO-25 shows a similar picture in terms of changes in earnings. Earnings in Cascade would increase by $5.2 million, while timber-linked earnings would increase by $6.4 million in New Meadows.

Alternative 3 emphasizes forest restoration, and this alternative would also show modest increases in Forest Service TSPQ requiring the construction of two new mills. The total timber-linked impact of this alternative would be 763 jobs for both 2005 and 2010 (SO-23 and SO-27). The total earning impact is $27.9 million (SO-25 and SO-29). As with Alternative 1B, the principal impacts would be in Cascade and McCall-Donnelly. Cascade would show an increase of 187 jobs in this alternative, while McCall-Donnelly would show an increase of 204 jobs. Earnings in Cascade would increase by $5.6 million and by $8.18 million in McCall-Donnelly.

Alternative 4 is a conservation alternative with incidental total wood flows of 27 MMBF/year. In the DEIS, Alternative 4 caused the greatest reduction in Forest Service timber-linked jobs. In the FEIS, however, the TSPQ already has declined dramatically, job losses have been realized, and now the job changes associated with Alternative 4 would be small. Specifically, Alternative 4 would show total jobs impacts of 12 new jobs, an increase of 4.4 percent over the current situation. The most significant change in jobs in this alternative would be in McCall-Donnelly, which would show an increase of 15 jobs (SO-23) and a comparable increase of $.47 million in earnings (SO-25).

Alternative 5 emphasizes commodity production and would have the highest total TSPQ at 144 MMBF/year, so it would have the greatest timber job impacts. Under this alternative, a third new sawmill would have to be constructed in the southern portion of the Ecogroup area to match new log flows and existing transportation nets. It is hypothetically placed in Fairfield, but could as easily be built in any of the surrounding communities such as Gooding or Mountain Home. The total impact of this alternative would be an increase of 1,059 jobs (SO-23 and SO-27) and $38.5 million increase in earnings. This alternative would have widespread impacts throughout the three National Forests. Cascade, Crouch-Garden Valley, Emmett, Fairfield, Idaho City, McCall-Donnelly, New Meadows, and Riggins would show significant changes in Forest Service-linked timber employment and earnings. With this alternative some communities would see very large relative increases in timber-linked employment. For example, Fairfield would show a relative increase of 7,100 percent in employment linked to Forest Service timber management, and McCall-Donnelly would show a 1,180 percent increase in jobs.

Under Alternative 6, the general pattern of impacts would be similar to those indicated under Alternative 4, and the differences would not be enough to be significant.

The new alternative in the FEIS is Alternative 7. It represents a new variant of alternative components found in the DEIS. This alternative has a mix of programmed ASQ and restoration volume, so its TSPQ of 106 MMBF is the third highest of the alternatives. It is enough to require two new local mills, one for small diameter logs and another for larger diameters. The total employment impact of this alternative would be 764 jobs, which reflects a 269 percent increase in jobs linked to Forest Service timber management. As shown in Tables S0-23 and SO-27, this alternative also would have widespread impacts throughout southwest Idaho. The largest numerical increases in employment would be projected in New Meadows (194 new jobs), Cascade (174 new jobs), Emmett (123 jobs), and McCall-Donnelly (97 jobs). Substantial relative increases also would be evident in Fairfield, which would show a 1,400 percent change in timber-linked employment. Changes in earnings would be also quite substantial with this alternative, with a total projected change in earnings of $27.9 million throughout southwest Idaho (SO-24 and SO-28).

Summary of Timber Effects - Timber volumes under Alternatives 4 and 6 are already in relative equilibrium with the existing local timber economy and would not result in substantial changes in timber-linked employment or earnings in any of the communities. The remaining five alternatives represent timber availability increases of varying degrees, and would thus produce substantial change in the timber economy of southwest Idaho. In particular, southwest Idaho communities with timber dependency are projected to experience large differences in employment and earnings impacts in these five alternatives. Under the assumptions of our modeling effort, the most noticeable changes would be at New Meadows and Cascade where new sawmills would be located. Other communities that would see substantial changes in employment and earnings are Council, Emmett, and McCall-Donnelly. In relative terms large impacts would also be experienced in Fairfield, Idaho City, and Riggins.

Table SO-21. Jobs Created by Forest Service Timber in Community Economies: Jobs Linked to Forest Service Timber Under the Current Situation

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Jobs	Timber-Linked Jobs	% Of Total	Total Jobs	Timber-Linked Jobs	% Of Total	Total Jobs	Timber-Linked Jobs	% Of Total
Cascade	878	27	3.0	961	27	2.8	1,038	27	2.6
Challis	1,220	0	0.0	1,278	0	0.0	1,350	0	0.0
Council	1,103	58	5.2	1,164	58	5.0	1,230	58	4.7
Crouch-Garden Valley	632	13	2.0	690	13	1.9	751	13	1.7
Emmett	5,366	37	0.7	5,654	37	0.7	5,952	37	0.6
Fairfield	642	1	0.2	701	1	0.2	757	1	0.2
Gooding	3,338	0	0.0	3,615	0	0.0	3,875	0	0.0
Hailey-Bellevue	4,607	0	0.0	5,074	0	0.0	5,533	0	0.0
Idaho City	724	17	2.3	801	17	2.1	882	17	1.9
Ketchum-Sun Valley	10,812	0	0.0	12,219	0	0.0	13,665	0	0.0
McCall-Donnelly	4,403	11	0.2	4,811	11	0.2	5,253	11	0.2
New Meadows	679	117	17.3	711	117	16.5	741	117	15.8
Oakley Valley	421	0	0.0	449	0	0.0	474	0	0.0
Raft River Valley	643	0	0.0	688	0	0.0	721	0	0.0
Riggins	643	3	0.4	696	3	0.4	742	3	0.4
Stanley	256	0	0.0	288	0	0.0	318	0	0.0
Weiser	4,333	0	0.0	4,566	0	0.0	4,811	0	0.0
TOTAL	**40,700**	**284**	**0.7**	**44,368**	**284**	**0.6**	**48,093**	**284**	**0.6**

Note: All job numbers are rounded to the nearest whole number, and all percentages are rounded to the nearest tenth of a percent.

Table SO-22. Earnings Created by Forest Service Timber in Community Economies: Earnings Linked to Forest Service Timber Under the Current Situation

Communities	-- 2000 --			-- 2005 --			-- 2010 --		
	Total Earnings ($1,000)	Timber-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Timber-Linked Earnings ($1,000)	% of Total	Total Earnings ($1,000)	Timber-Linked Earnings ($1,000)	% of Total
Cascade	18,645	797	4.3	21,700	797	3.7	24,828	797	3.2
Challis	31,521	0	0.0	34,661	0	0.0	37,790	0	0.0
Council	29,042	2,655	9.1	31,796	2,655	8.4	34,696	2,655	7.7
Crouch-Garden Valley	13,073	141	1.1	14,929	141	0.9	16,952	141	0.8
Emmett	107,958	1,797	1.7	118,349	1,797	1.5	129,606	1,797	1.4
Fairfield	14,216	35	0.2	15,733	35	0.2	17,316	35	0.2
Gooding	87,746	0	0.0	97,995	0	0.0	108,305	0	0.0
Hailey-Bellevue	134,468	0	0.0	155,270	0	0.0	177,156	0	0.0
Idaho City	14,016	422	3.0	16,204	422	2.6	18,602	422	2.3
Ketchum-Sun Valley	293,896	0	0.0	348,552	0	0.0	408,713	0	0.0
McCall-Donnelly	88,461	341	0.4	102,309	341	0.3	116,730	341	0.3
New Meadows	24,494	4,697	19.2	26,380	4,697	17.8	28,267	4,697	16.6
Oakley Valley	12,871	0	0.0	14,135	0	0.0	15,394	0	0.0
Raft River Valley	23,237	0	0.0	25,297	0	0.0	27,196	0	0.0
Riggins	13,296	57	0.4	14,918	57	0.4	16,509	57	0.3
Stanley	4,538	0	0.0	5,246	0	0.0	5,977	0	0.0
Weiser	78,802	0	0.0	86,665	0	0.0	95,180	0	0.0
TOTAL	**990,279**	**10,942**	**1.1**	**1,130,140**	**10,942**	**1.0**	**1,279,216**	**10,942**	**0.9**

Table SO-23. Forest Service Timber-Linked Jobs Indicated by Alternative: 2005

Communities	Current Situation		Change In Total Jobs**						
	Total Jobs	FS Timber-Linked Jobs*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	961	27	98	173	187	-2	203	2	174
Challis	1,278	0	0	0	0	0	0	0	0
Council	1,164	58	100	48	98	-5	114	3	82
Crouch-Garden V.	690	13	24	20	29	-1	33	1	20
Emmett	5,654	37	458	99	116	2	171	5	123
Fairfield	701	1	4	4	18	2	83	0	16
Gooding	3,615	0	0	0	0	0	0	0	0
Hailey-Bellevue	5,074	0	0	0	0	0	0	0	0
Idaho City	801	17	46	23	37	-1	54	0	48
Ketchum -Sun V.	12,219	0	0	0	0	0	0	0	0
McCall-Donnelly	4,811	11	107	74	66	15	126	1	97
New Meadows	711	117	153	159	204	2	262	5	194
Oakley Valley	449	0	0	0	0	0	0	0	0
Raft River Valley	668	0	0	0	0	0	0	0	0
Riggins	696	3	10	6	8	0	13	0	9
Stanley	288	0	0	0	0	0	0	0	0
Weiser	4,566	0	0	0	0	0	0	0	0
TOTAL	**44,368**	**284**	**1,000**	**605**	**763**	**12**	**1,059**	**18**	**764**

*Timber jobs linked to timber harvested from Forest Service administered lands.

**Change in total timber-related jobs, including those linked to timber harvested from National Forest *and* non-National Forest lands.

Note: All job numbers are rounded to the nearest whole number.

Table SO-24. Percent Change in Timber-Linked Jobs Indicated by Alternative: 2005

Communities	Percent Change In Total Jobs Compared to FS Timber-Linked Jobs*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	367.5	650.3	704.8	-7.0	764.1	6.8	656.9
Challis	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Council	173.7	82.5	169.9	-9.0	197.0	5.5	141.9
Crouch-Garden Valley	188.7	153.3	223.8	-6.7	257.2	6.5	155.0
Emmett	1223.5	264.1	310.7	5.3	456.7	13.5	329.0
Fairfield	300.0	300.0	1500.0	200.0	7100.0	0.0	1400.0
Gooding	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	273.8	136.4	220.8	6.4	320.0	2.6	286.3
Ketchum -Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	1005.6	699.7	618.2	139.0	1180.3	10.7	911.5
New Meadows	130.1	135.4	174.1	1.8	223.3	4.4	165.0
Oakley Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft River Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riggins	361.5	219.6	274.2	5.8	453.1	14.6	306.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**352.7**	**213.4**	**269.2**	**4.4**	**373.3**	**6.4**	**269.3**

*The percent change reflects the change in total jobs for alternatives as compared to the FS timber-linked jobs in Table SO-23.
Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-25. Forest Service Timber-Linked Earnings Indicated by Alternative: 2005

Communities	Current Situation		Change in Total Earnings ($1,000)						
	Total Earnings ($1,000)	FS Timber-Linked Earnings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	21,700	797	2,927	5,180	5,614	-56	6,086	54	5,232
Challis	34,661	0	0	0	0	0	0	0	0
Council	31,796	2,655	4,614	2,191	4,512	-238	5,231	146	3,769
Crouch-Garden V.	14,929	141	267	217	316	-9	364	9	219
Emmett	118,349	1,797	21,983	4,746	5,583	96	8,205	242	5,912
Fairfield	15,733	35	105	105	527	70	2,492	0	491
Gooding	97,995	0	0	0	0	0	0	0	0
Hailey-Bellevue	155,270	0	0	0	0	0	0	0	0
Idaho City	16,204	422	1,156	576	932	-27	1,352	11	1,209
Ketchum -Sun V.	348,552	0	0	0	0	0	0	0	0
McCall-Donnelly	102,309	341	3,426	2,384	2,106	474	4,021	36	3,106
New Meadows	26,380	4,697	6,111	6,358	8,179	83	10,489	209	7,750
Oakley Valley	14,135	0	0	0	0	0	0	0	0
Raft River Valley	25,297	0	0	0	0	0	0	0	0
Riggins	14,918	57	207	126	157	3	259	8	175
Stanley	5,246	0	0	0	0	0	0	0	0
Weiser	86,665	0	0	0	0	0	0	0	0
TOTAL	**1,130,140**	**10,942**	**40,796**	**21,882**	**27,927**	**395**	**38,499**	**717**	**27,864**

Note: All earnings numbers are expressed in thousands of dollars and rounded to the nearest thousand.

Table SO-26. Percent Change in Timber-Linked Earnings Indicated by Alternative: 2005

Communities	Percent Change In Total Earnings Compared to FS Timber-Linked Earnings*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	367.5	650.3	704.8	-7.0	764.1	6.8	656.9
Challis	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Council	173.7	82.5	169.9	-9.0	197.0	5.5	141.9
Crouch-Garden Valley	188.7	153.3	223.8	-6.7	257.2	6.5	155.0
Emmett	1223.5	264.1	310.7	5.3	456.7	13.5	329.0
Fairfield	300.0	300.0	1500.0	200.0	7100.0	0.00	1400.0
Gooding	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	273.8	136.4	220.8	-6.4	320.0	2.6	286.3
Ketchum -Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	1005.6	699.7	618.2	139.0	1180.3	10.7	911.5
New Meadows	130.1	135.4	174.1	1.8	223.3	4.4	165.0
Oakley Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft River Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riggins	361.5	219.6	274.2	5.8	453.1	14.6	306.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**372.8**	**200.0**	**255.2**	**3.6**	**351.8**	**6.5**	**254.6**

*The percent change reflects the change in total earnings for alternatives as compared to the FS timber-linked earnings in Table SO-25. Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-27. Forest Service Timber-Linked Jobs Indicated by Alternative: 2010

Communities	Current Situation		Change In Total Jobs**						
	Total Jobs	FS Timber-Linked Jobs*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	1,038	27	98	173	187	-2	203	2	174
Challis	1,350	0	0	0	0	0	0	0	0
Council	1,230	58	100	48	98	-5	114	3	82
Crouch-Garden V.	751	13	24	20	29	-1	33	1	20
Emmett	5,952	37	458	99	116	2	171	5	123
Fairfield	757	1	4	4	18	2	83	0	16
Gooding	3,875	0	0	0	0	0	0	0	0
Hailey-Bellevue	5,533	0	0	0	0	0	0	0	0
Idaho City	882	17	46	23	37	-1	54	0	48
Ketchum -Sun V.	13,665	0	0	0	0	0	0	0	0
McCall-Donnelly	5,253	11	107	74	66	15	126	1	97
New Meadows	741	117	153	159	204	2	262	5	194
Oakley Valley	474	0	0	0	0	0	0	0	0
Raft River Valley	721	0	0	0	0	0	0	0	0
Riggins	742	3	10	6	8	0	13	0	9
Stanley	318	0	0	0	0	0	0	0	0
Weiser	4,811	0	0	0	0	0	0	0	0
TOTAL	**48,093**	**284**	**1,000**	**605**	**763**	**12**	**1,059**	**18**	**764**

*Timber jobs linked to timber harvested from Forest Service administered lands.
**Change in total timber-related jobs, including those linked to timber harvested from National Forest *and* non-National Forest lands.
Note: All job numbers are rounded to the nearest whole number.

Table SO-28. Percent Change in Timber-Linked Jobs Indicated by Alternative: 2010

Communities	Percent Change In Total Jobs Compared to FS Timber-Linked Jobs*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	367.5	650.3	704.8	-7.0	764.1	6.8	656.9
Challis	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Council	173.7	82.5	169.9	-9.0	197.0	5.5	141.9
Crouch-Garden Valley	188.7	153.3	223.8	-6.7	257.2	6.5	155.0
Emmett	1223.5	264.1	310.7	5.3	456.7	13.5	329.0
Fairfield	300.0	300.0	1500.0	200.0	7100.0	0.0	1400.0
Gooding	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	273.8	136.4	220.8	-6.4	320.0	2.6	286.3
Ketchum -Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	1005.6	699.7	618.2	139.0	1180.3	10.7	911.5
New Meadows	130.1	135.4	174.1	1.8	223.3	4.4	165.0
Oakley Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft River Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riggins	361.5	219.6	274.2	5.8	453.1	14.6	306.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**352.7**	**213.4**	**269.2**	**4.4**	**373.3**	**6.4**	**269.3**

*The percent change reflects the change in total jobs for alternatives as compared to the FS timber-linked jobs in Table SO-27.
Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-29. Forest Service Timber-Linked Earnings Indicated by Alternative: 2010

Communities	Current Situation		Change in Total Earnings ($1,000)						
	Total Earnings ($1,000)	FS Timber-Linked Earnings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	24,828	797	2,927	5,180	5,614	-56	6,086	54	5,232
Challis	37,790	0	0	0	0	0	0	0	0
Council	34,696	2,655	4,614	2,191	4,512	-238	5,231	146	3,769
Crouch-Garden V.	16,952	141	267	217	316	-9	364	9	219
Emmett	129,606	1,797	21,983	4,746	5,583	96	8,205	242	5,912
Fairfield	17,316	35	105	105	527	70	2,492	0	491
Gooding	108,305	0	0	0	0	0	0	0	0
Hailey-Bellevue	177,156	0	0	0	0	0	0	0	0
Idaho City	18,602	422	1,156	576	932	-27	1,352	11	1,209
Ketchum -Sun V.	408,713	0	0	0	0	0	0	0	0
McCall-Donnelly	116,730	341	3,426	2,384	2,106	474	4,021	36	3,106
New Meadows	28,267	4,697	6,111	6,358	8,179	83	10,489	209	7,750
Oakley Valley	15,394	0	0	0	0	0	0	0	0
Raft River Valley	27,196	0	0	0	0	0	0	0	0
Riggins	16,509	57	207	126	157	3	259	8	175
Stanley	5,977	0	0	0	0	0	0	0	0
Weiser	95,180	0	0	0	0	0	0	0	0
TOTAL	**1,279,216**	**10,942**	**40,796**	**21,882**	**27,927**	**395**	**38,499**	**717**	**27,864**

Note: All earnings numbers are expressed in thousands of dollars and rounded to the nearest thousand.

Table SO-30. Percent Change in Timber-Linked Earnings Indicated by Alternative: 2010

Communities	Percent Change In Total Earnings Compared to FS Timber-Linked Earnings*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	367.5	650.3	704.8	-7.0	764.1	6.8	656.9
Challis	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Council	173.7	82.5	169.9	-9.0	197.0	5.5	141.9
Crouch-Garden Valley	188.7	153.3	223.8	-6.7	257.2	6.5	155.0
Emmett	1223.5	264.1	310.7	5.3	456.7	13.5	329.0
Fairfield	300.0	300.0	1500.0	200.0	7100.0	0.0	1400.0
Gooding	0.0	0.0	0.0	0. 0	0.0	0.0	0.0
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	273.8	136.4	220.8	-6.4	320.0	2.6	286.3
Ketchum -Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	1005.6	699.7	618.2	139.0	1180.3	10.7	911.5
New Meadows	130.1	135.4	174.1	1.8	223.3	4.4	165.0
Oakley Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft River Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riggins	361.5	219.6	274.2	5.8	453.1	14.6	306.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**372.8**	**200.0**	**255.2**	**3.6**	**351.8**	**6.5**	**254.6**

*The percent change reflects the change in total earnings for alternatives as compared to the FS timber-linked earnings in Table SO-29. Note: All percentages are rounded to the nearest tenth of a percent.

Financial and Economic Efficiency

This financial and economic efficiency analysis examines revenue and cost implications from the perspective of the Forest Service. It could also be said that this is the perspective of the taxpayer. Only those revenues and costs that are recorded in financial records are included in this analysis.

The Forest Service is not a business. Revenues collected are sent to the federal treasury, from where some are returned to the Forests as Trust Funds, some are returned to the States where they were generated, and some stay in the treasury to fund government programs in general. In addition, the market does not set many of the prices for Forest Service provided goods and services. Some, such as grazing fees, are set by Congress.

When considering quantitative issues, financial efficiency analysis offers a consistent measure in dollars for comparison of alternatives. This type of analysis does not account for non-market benefits, opportunity costs, individual values, or other values, benefits, and costs that are not easily quantifiable. This is not to imply that such values are not significant or important – but to recognize that non-market values are difficult to represent with appropriate dollar figures. The values not included in this part of the analysis are often at the center of interest and disagreement that people have about forest resource projects. Therefore, financial efficiency should not be viewed as a complete answer but as a tool decision makers use to gain information about resources, alternatives, and trade-offs between quantifiable costs and revenues.

The main criterion used in assessing financial efficiency is present net value (PNV), which is defined as the value of discounted revenues minus discounted costs. A PNV analysis includes all outputs—including timber, grazing, and recreation—to which monetary values are assigned. In deriving PNV figures, costs are subtracted from revenues to yield a net value. "Future values" (i.e., revenues received in the future) are discounted using an appropriate discount rate to obtain a "present value". The PNV of a given alternative is the discounted sum of all revenues minus the sum of all costs associated with that alternative. Because PNV estimates, as required by the National Forest Management Act (36 CFR 219), attempt to condense a large amount of information into a single value, they must be used with caution.

Tables SO-31 through SO-34 display the financial PNV for each alternative. A 4 percent discount rate was used over a period of 50 years (2000-2049). While the planning horizon for the Forest Plans is 10-15 years, the PNV analysis considers costs and revenues into the future to account for long-term revenues and costs. Although the question of the appropriate discount rate to use is debatable, the four percent level is consistent with what is commonly used in evaluation of public policy. Revenues are not reduced for payments made to states and counties. The reduction of PNV in any alternative as compared to the most financially efficient solution is the economic trade-off, or opportunity cost, of achieving that alternative.

The analysis below compares the financial efficiency of the seven alternatives over a 50-year period. Estimates for the calculations were determined using information from budget ledgers and forest files and entered into *Quick-Silver Investment Analysis*, an economic computer model program, to calculate the results. The costs used in this analysis are the estimated budget costs at the actually experienced budget levels for FY 2002.

The model was run using four different scenarios: 1) the Boise National Forest; 2) the Payette National Forest; 3) the Sawtooth National Forest, and 4) all three Ecogroup Forests combined. Displayed under the four different scenarios are revenues, costs, present net value (PNV), and the revenue/cost ratio. Ratios greater than one indicate that revenues exceed costs, and ratios less than one indicate that costs exceed the revenues. Alternatives featuring higher levels of commodity production have the highest PNV and revenue/cost ratio.

Boise National Forest - Table SO-31 shows the results of the financial analysis by alternative for the Boise National Forest. All alternatives have a positive PNV and revenue/cost ratio of more than one. The alternatives featuring higher levels of commodity production have the highest PNV and revenue/cost ratio. Alternatives 5 and 1B have the highest PNVs at $2,400 million and $2,077 million, respectively. Alternatives 4 and 6 have the lowest PNVs at $40 million and $201 million, respectively.

Table SO-31. Discounted Revenues and Costs, and PNV (in Millions of Dollars) by Alternative at the Experienced Budget Level for the Boise National Forest

Indicator	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Revenue	$2,843	$2,058	$2,165	$597	$3,233	$745	$2,325
Costs	-$766	-$658	-$659	-$557	-$832	-$545	-$742
Present Net Value	$2,077	$1,399	$1,506	$40	$2,400	$201	$1,583
Revenue/Cost Ratio	3.71	3.13	3.28	1.07	3.88	1.37	3.13

Payette National Forest - Table SO-32 shows the results of the financial analysis for each alternative for the Payette National Forest. All alternatives have a positive PNV and revenue/cost ratio of more than one. Alternatives 5 and 1B have the highest PNVs with $2,556 million and $1,988 million, respectively. Alternatives 4 and 6 have the lowest PNVs at $219 million and $473 million, respectively.

Table SO-32. Discounted Revenues and Costs, and PNV (in Millions of Dollars) by Alternative at the Experienced Budget Level for the Payette National Forest

Indicator	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Revenue	$2,487	$1,674	$2,132	$586	$3,097	$849	$2,164
Costs	-$498	-$413	-$419	-$367	-$540	-$377	-$480
Present Net Value	$1,988	$1,261	$1,713	$219	$2,556	$473	$1,684
Revenue/Cost Ratio	4.99	4.06	5.08	1.60	5.73	2.26	4.51

Sawtooth National Forest - Table SO-33 shows the results of the financial analysis for each alternative for the Sawtooth National Forest. Alternatives 1B, 2, 3, 5, and 7 have a positive PNV and revenue/cost ratio more than one. Alternatives 7 and 5 had the highest PNVs with $481 million and $300 million, respectively. Alternatives 6 and 4 had the lowest PNVs with -$132 million and -$98 million, respectively.

Table SO-33. Discounted Revenues and Costs, and PNV (in Millions of Dollars) by Alternative at the Experienced Budget Level for the Sawtooth National Forest

Indicator	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Revenue	$433	$368	$382	$126	$560	$90	$481
Costs	-$246	-$244	-$245	-$224	-$260	-$222	-$256
Present Net Value	$188	$125	$137	-$98	$300	-$132	$481
Revenue/Cost Ratio	1.76	1.51	1.56	0.56	2.15	0.41	1.88

Southwest Idaho Ecogroup - Table SO-34 shows the results of the financial analysis for each alternative Ecogroup-wide. All alternatives have a positive PNV and a revenue/cost ratio of more than one. Alternatives 5 and 1B have the highest PNVs at $5,257 million and $4,253 million, respectively, at the current budget levels. Alternatives 4 and 6 have the lowest PNVs at $162 million and $542 million, respectively.

Table SO-34. Discounted Revenues and Costs, and PNV (in Millions of Dollars) by Alternative at the Experienced Budget Level for the Ecogroup

Indicator	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Revenues	$5,763	$4,100	$4,680	$1,309	$6,889	$1,685	$4,970
Costs	-$1,510	-$1,315	-$1,324	-$1,147	-$1,633	-$1,143	-$1,478
Present Net Value	$4,253	$2,786	$3,356	$162	$5,257	$542	$3,492
Revenue/Cost Ratio	3.82	3.12	3.53	1.14	4.22	1.47	3.36

Cumulative Effects

Cumulative effects analysis discusses the *context* of the alternatives' effects within the planning area. For this analysis, the area encompassed by the 17 counties and 19 communities described earlier is generally considered the cumulative effects analysis area, because it represents the contiguous geographic area most affected by socio-economic changes in management of the Boise, Payette and Sawtooth National Forests.[13]

Socio-economic changes in the cumulative effects analysis area are caused by actions initiated by various businesses, governments, and other organizations. Many decisions will be made by multiple entities over the next decade, all affecting socio-economic factors such as jobs and income; lifestyles; and attitudes, beliefs and values. As noted earlier in this analysis, some of these decisions arise from litigation, or new environmental regulations or analysis requirements adopted at a national level—factors outside the scope of Forest Plan revision. Specific findings for each socio-economic indicator are discussed below:

Population

Table SO-3, included in the Current Conditions discussion, shows population figures for each of the 17 counties projected for the years 2010 and 2020. The total population of the 17-county area was 655,702 in 2000, and is projected to increase to 771,497 by 2010 (17.6 percent increase from 2000), and to 886,552 by 2020 (14.9 percent increase from 2010). As noted earlier, the population of these counties is not anticipated to change by alternative, and therefore, no cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Employment

Tables SO-35, SO-36, SO-37, and SO-38 indicate the number and percentage of cumulative jobs in the 17 communities linked to Forest Service activities in 2005 and 2010, respectively.

In 2005, the number of jobs varies from a loss of 2 jobs under Alternative 4 (as compared with current conditions) to a gain of 1,050 jobs under Alternative 5. The percentage of change ranges from –0.1 to 30.9 relative to the current level of jobs linked to Forest Service outputs, projected to 2005. However, the percentage of change declines substantially when compared to the projected current level of *all* 44,368 jobs in the 19 communities, from –0.1 percent under Alternative 4 to 2.4 percent under Alternative 5. Consequently, no significant cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

In 2010, the number of jobs varies from a loss of 22 jobs under Alternative 4 (again, as compared with current conditions) to a gain of 1,049 jobs under Alternative 5. The percentage of change ranges from –0.1 to 29.7 relative to the current level of jobs linked to Forest Service outputs, projected to 2010. However, the percentage of change declines substantially when compared to the projected current level of *all* 48,093 jobs in the 17 communities, from –0.1 percent under Alternative 4 to 2.2 percent under Alternative 5. Consequently, no significant cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

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[13] More specifically, for the population indicator, the analysis area includes the 17 counties; and for the employment and indicators, the analysis area includes the 17 communities for which community economic profiles were prepared and analyzed by alternative.

Communities in southwest Idaho vary considerably in their resource dependency. For example, McCall-Donnelly has 672 jobs (Table SO-35) linked to Forest Service outputs. This constitutes about 14 percent of all employment in the McCall-Donnelly area. In contrast Stanley has only 216 jobs linked to Forest Service outputs, but this constitutes 75 percent of all employment in the Stanley area. Other communities that are very dependent on Forest Service outputs are Crouch-Garden Valley (37 percent), New Meadows (26 percent), Challis (24 percent), Fairfield (20 percent) and Cascade (20 percent).

The alternative that has the largest employment impact in the region is Alternative 5 (Tables SO-35 and SO-37). This alternative has a total impact in 2005 of 1,050 jobs and an impact in 2010 of 1,049 jobs. The two communities most strongly impacted by this alternative are Emmett, with a 139.8 percent change in employment, and New Meadows with 141.5 percent employment linked to Forest Service outputs. Note that the impact of Forest Service outputs vary considerably for any given community across the range of Forest Service management alternatives. For example, Emmett has an increase of 171 jobs in Alternative 5, and has a much larger increase of 458 jobs in Alternative 1B.

Table SO-35. Jobs Indicated by All Forest Outputs by Alternative: 2005

Communities	Current Situation		Change In Total Jobs**						
	Total Jobs	All FS Output Linked Jobs*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	961	189	98	173	187	-2	203	2	174
Challis	1,278	300	0	-1	-1	-1	0	-1	-1
Council	1,164	131	100	44	96	-8	110	-2	77
Crouch-Garden V.	690	256	24	20	29	-1	33	1	20
Emmett	5,654	122	458	98	115	-0	171	4	121
Fairfield	701	139	4	4	18	2	83	0	16
Gooding	3,615	140	0	-3	-2	-2	-3	-5	-5
Hailey-Bellevue	5,074	0	0	0	0	0	0	0	0
Idaho City	801	53	46	23	37	-1	54	0	48
Ketchum-Sun V.	12,219	0	0	0	0	0	0	0	0
McCall-Donnelly	4,811	672	107	74	66	15	125	1	97
New Meadows	711	185	153	158	204	1	262	5	193
Oakley Valley	449	14	0	0	0	0	0	0	0
Raft River Valley	668	62	0	-0	-0	-1	0	-7	-7
Riggins	696	123	10	5	7	-1	12	-1	8
Stanley	288	216	0	0	0	0	0	0	0
Weiser	4,566	128	0	0	0	0	0	0	0
TOTAL	**44,368**	**3,401**	**1,000**	**595**	**755**	**1**	**1,050**	**-2**	**742**

*Timber jobs linked to timber harvested from Forest Service administered lands.
**Change in total timber-related jobs, including those linked to timber harvested from National Forest *and* non-National Forest lands.
Note: All job numbers are rounded to the nearest whole number.

Table SO-36. Percent Change in Jobs Indicated by All Forest Outputs by Alternative: 2005

Communities	Percent Change In Total Jobs Compared to All FS-Linked Jobs*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	51.7	91.5	99.2	-1.0	107.6	1.0	92.5
Challis	0.0	-0.2	-0.2	-0.2	0.0	-0.2	-0.2
Council	76.8	34.0	73.3	-5.7	84.5	-1.3	58.9
Crouch-Garden Valley	9.5	7.7	11.2	-0.3	12.9	0.3	7.8
Emmett	375.5	80.7	94.5	-0.2	139.8	3.5	99.5
Fairfield	2.5	2.5	12.7	1.7	59.9	0.0	11.8
Gooding	0.0	-2.3	-1.7	-1.7	-2.3	-3.4	-3.6
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	87.7	43.7	70.7	-2.1	102.5	0.8	91.7
Ketchum-Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	15.9	11.1	9.8	2.2	18.7	0.1	14.4
New Meadows	82.6	85.6	110.3	0.8	141.5	2.5	104.4
Oakley Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft River Valley	0.0	-0.7	-0.2	-2.2	0.0	-10.6	-11.1
Riggins	8.4	4.3	5.5	-0.7	9.7	-0.5	6.2
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**29.4**	**17.5**	**22.2**	**0.0**	**30.9**	**-0.1**	**21.8**

*The percent change reflects the change in total jobs for alternatives as compared to all Forest Service-linked jobs in Table SO-31.
Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-37. Jobs Indicated by All Forest Outputs by Alternative: 2010

Communities	Current Situation		Change In Total Jobs**						
	Total Jobs	All FS Output Linked Jobs*	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	1,038	203	98	173	187	-2	203	2	174
Challis	1,350	302	0	-1	-1	-1	0	-1	-1
Council	1,230	137	100	42	93	-10	108	-4	74
Crouch-Garden V.	751	258	24	20	29	-1	33	1	20
Emmett	5,952	126	458	98	115	-1	170	4	121
Fairfield	757	139	4	4	18	2	83	0	16
Gooding	3,875	144	0	-9	-10	-17	1	-6	-6
Hailey-Bellevue	5,533	169	0	0	0	0	0	0	0
Idaho City	882	55	46	23	37	-1	54	0	48
Ketchum-Sun V.	13,665	503	0	0	0	0	0	0	0
McCall-Donnelly	5,253	731	107	74	66	15	125	1	97
New Meadows	741	191	153	158	203	1	261	4	193
Oakley Valley	474	13	0	0	-0	-1	0	-0	-0
Raft River Valley	721	62	0	-1	-0	-3	1	0	0
Riggins	742	134	10	4	6	-2	11	-2	7
Stanley	318	230	0	0	0	0	0	0	0
Weiser	4,811	137	0	-2	-2	-2	-2	-2	-2
TOTAL	**48,093**	**3,532**	**1,000**	**583**	**739**	**-22**	**1,049**	**-4**	**740**

*Timber jobs linked to timber harvested from Forest Service administered lands.
**Change in total timber-related jobs, including those linked to timber harvested from National Forest *and* non-National Forest lands.
Note: All job numbers are rounded to the nearest whole number.

Table SO-38. Percent Change in Jobs Indicated by All Forest Outputs by Alternative: 2010

Communities	Percent Change In Total Jobs Compared to All FS-Linked Jobs*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	48.2	85.2	92.4	-0.9	100.1	0.9	86.1
Challis	0.0	-0.5	-0.5	-0.5	0.0	-0.5	-0.5
Council	73.2	30.9	67.9	-7.5	79.1	-3.2	54.0
Crouch-Garden Valley	9.4	7.6	11.2	-0.3	12.8	0.3	7.7
Emmett	362.6	77.8	90.7	-0.8	134.8	3.0	95.7
Fairfield	2.5	2.5	12.6	1.7	59.9	0.0	11.8
Gooding	0.0	-6.5	-7.0	-11.8	0.7	-4.2	-4.2
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	84.6	42.1	68.2	-2.0	98.9	0.8	88.5
Ketchum -Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	14.7	10.2	9.0	2.0	17.2	0.1	13.2
New Meadows	80.0	82.7	106.6	0.6	136.8	2.2	100.0
Oakley Valley	0.0	0.0	-1.3	-5.5	0.0	-2.7	-2.8
Raft River Valley	0.0	-0.9	-0.7	-4.1	0.9	0.4	0.5
Riggins	7.7	3.2	4.4	-1.4	8.2	-1.2	5.0
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
TOTAL	**28.3**	**16.5**	**20.0**	**-0.6**	**29.7**	**-0.1**	**21.0**

*The percent change reflects the change in total jobs for alternatives as compared to all Forest Service-linked jobs in Table SO-35.
Note: All percentages are rounded to the nearest tenth of a percent.

Income

Tables SO-39, SO-40, SO-41, and SO-42 indicate the cumulative earnings and percentage of earnings in the 17 communities linked to Forest Service activities in 2005 and 2010, respectively.

In 2005, the level of earnings varies from a gain of $139,000 under Alternative 4 (as compared with projected current conditions) to a gain of $40,796,000 under Alternative 1B. The percentage of change ranges from 0.2 percent to 57.9 percent relative to the current level of earnings linked to Forest Service outputs, projected to 2005. However, the percentage of change declines substantially when compared to the projected current level of $1,130,140,000 in the total earnings for the 17 communities, from –0.1 percent under Alternative 4 to 3.6 percent under Alternative 1B. Consequently, no significant cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

In 2010, the level of earnings varies from a loss of $373,000 under Alternative 4 (as compared with current conditions) to a gain of $40,796,000 under Alternative 1B. The percentage of change ranges from –0.5 to 52.5 relative to the current level of earnings linked to Forest Service outputs, projected to 2010. However, the percentage of change declines substantially when compared to the projected current level of $1,279,216,000 in the total earnings for the 17 communities, from –0.1 percent under Alternative 4 to 3.1 percent under Alternative 1B. Consequently, no significant cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Table SO-39. Earnings Indicated by All Forest Outputs by Alternative: 2005

Communities	Current Situation		Change in Total Earnings ($1,000)						
	Total Earnings ($1,000)	All FS Output Linked Earnings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	21,700	3,688	2,927	5,180	5,614	-56	6,086	54	5,232
Challis	34,661	4,698	0	-15	-15	-15	0	-15	-15
Council	31,796	3,888	4,614	2,123	4,464	-287	5,163	45	3,664
Crouch-Garden V.	14,929	2,773	267	217	316	-9	364	9	219
Emmett	118,349	3,048	21,983	4,739	5,563	54	8,198	228	5,896
Fairfield	15,733	1,228	105	105	527	70	2,492	0	491
Gooding	97,995	3,366	0	-68	-48	-48	-68	-101	-105
Hailey-Bellevue	155,270	5,208	0	0	0	0	0	0	0
Idaho City	16,204	938	1,156	576	932	-27	1352	11	1,209
Ketchum -Sun V.	348,552	13,564	0	0	0	0	0	0	0
McCall-Donnelly	102,309	12,135	3,426	2,380	2,106	474	4,018	33	3,102
New Meadows	26,380	5,662	6,111	6,346	8,166	70	10,477	197	7,737
Oakley Valley	14,135	432	0	0	0	-15	0	-26	-27
Raft River Valley	25,297	2,129	0	-15	-5	-47	0	-226	-236
Riggins	14,918	1,835	207	104	136	-18	238	-13	153
Stanley	5,246	3,993	0	0	0	0	0	0	0
Weiser	86,665	1,863	0	-8	-8	-8	-7	-9	-9
TOTAL	**1,130,140**	**70,447**	**40,796**	**21,664**	**27,749**	**139**	**38,311**	**188**	**27,311**

Note: All earnings numbers are expressed in thousands of dollars and rounded to the nearest thousand.

Table SO-40. Percent Change in Earnings Indicated by All Forest Outputs by Alternative: 2005

Communities	Percent Change In Total Earnings Compared to All Forest Service-Linked Earnings*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	79.4	140.4	152.2	-1.5	165.0	1.5	141.9
Challis	0.0	-0.3	-0.3	-0.3	0.0	-0.3	-0.3
Council	118.7	54.6	114.8	-7.4	132.8	1.2	94.2
Crouch-Garden Valley	9.6	7.8	11.4	-0.3	13.1	0.3	7.9
Emmett	721.3	155.5	182.5	1.8	269.0	7.5	193.5
Fairfield	8.6	8.6	42.9	5.7	203.0	0.0	40.0
Gooding	0.0	-2.0	-1.4	-1.4	-2.0	-3.0	-3.1
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	123.3	61.4	99.4	-2.9	144.1	1.2	128.9
Ketchum -Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	28.2	19.6	17.4	3.9	33.1	0.3	25.6
New Meadows	107.9	112.1	144.2	1.2	185.0	3.5	136.7
Oakley Valley	0.0	0.0	0.0	-3.5	0.0	-6.0	-6.2
Raft River Valley	0.0	-0.7	-0.2	-2.2	0.0	-10.6	-11.1
Riggins	11.3	5.7	7.4	-1.0	13.0	-0.7	8.3
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5
TOTAL	**57.9**	**30.8**	**39.4**	**0.2**	**54.4**	**0.3**	**38.8**

*The percent change reflects the change in total earnings for alternatives as compared to the FS timber-linked earnings in Table SO-33. Note: All percentages are rounded to the nearest tenth of a percent.

Table SO-41. Earnings Indicated by All Forest Outputs by Alternative: 2010

Communities	Current Situation		Change in Total Earnings ($1,000)						
	Total Earnings ($1,000)	All FS Output Linked Earnings	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	24,828	4,087	2,927	5,180	5,614	-56	6,086	54	5,232
Challis	37,790	5,090	0	-33	-33	-33	0	-33	-35
Council	34,696	4,001	4,614	2,081	4,406	-345	5,120	-13	3,603
Crouch-Garden V.	16,952	3,126	267	217	316	-9	364	9	219
Emmett	129,606	3,113	21,983	4,736	5,551	40	8,192	219	5,887
Fairfield	17,316	1,348	105	105	527	70	2,492	0	491
Gooding	108,305	3,542	0	-205	-215	-363	20	-142	-148
Hailey-Bellevue	177,156	5,942	0	0	0	0	0	0	0
Idaho City	18,602	1,014	1,156	576	932	-27	1,352	11	1,209
Ketchum-Sun V.	408,713	15,905	0	0	0	0	0	0	0
McCall-Donnelly	116,730	13,904	3,426	2,379	2,105	472	4,016	31	3,100
New Meadows	28,267	5,744	6,111	6,337	8,158	62	10,468	188	7,728
Oakley Valley	15,394	423	0	0	-5	-21	0	-10	-11
Raft River Valley	27,196	2,131	0	-20	-15	-88	19	9	10
Riggins	16,509	2,033	207	83	115	-39	217	-34	131
Stanley	5,977	4,399	0	0	0	0	0	0	0
Weiser	95,180	2,026	0	-34	-35	-35	-33	-37	-38
TOTAL	**1,279,216**	**77,827**	**40,796**	**21,401**	**27,420**	**-373**	**38,313**	**254**	**27,381**

Note: All earnings numbers are expressed in thousands of dollars and rounded to the nearest thousand.

Table SO-42. Percent Change in Earnings Indicated by All Forest Outputs by Alternative: 2010

Communities	Percent Change In Total Earnings Compared to All Forest Service-Linked Earnings*						
	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Cascade	71.6	126.7	137.4	-1.4	148.9	1.3	128.0
Challis	0.0	-0.6	-0.6	-0.6	0.0	-0.6	-0.7
Council	115.3	52.0	110.1	-8.6	128.0	-0.3	90.0
Crouch-Garden Valley	8.5	6.9	10.1	-0.3	11.6	0.3	7.0
Emmett	706.3	152.1	178.3	1.3	263.2	7.0	189.1
Fairfield	7.8	7.8	39.1	5.2	184.9	0.0	36.5
Gooding	0.0	-5.8	-6.1	-10.3	0.6	-4.0	-4.2
Hailey-Bellevue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho City	114.0	56.8	92.0	-2.7	133.3	1.1	119.2
Ketchum-Sun Valley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
McCall-Donnelly	24.6	17.1	15.1	3.4	28.9	0.2	22.3
New Meadows	106.4	110.3	142.0	1.1	182.2	3.3	134.5
Oakley Valley	0.0	0.0	-1.2	-5.0	0.0	-2.4	-2.6
Raft River Valley	0.0	-0.9	-0.7	-4.1	0.9	0.4	0.5
Riggins	10.2	4.1	5.6	-1.9	10.7	-1.7	6.5
Stanley	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weiser	0.0	-1.7	-1.7	-1.7	-1.6	-1.8	-1.9
TOTAL	**52.4**	**27.5**	**35.2**	**-0.5**	**49.2**	**0.3**	**35.2**

*The percent change reflects the change in total earnings for alternatives as compared to the FS timber-linked earnings in Table SO-37. Note: All percentages are rounded to the nearest tenth of a percent.

The largest change in earnings in any of the alternatives is an increase of $21.983 million in Emmett in Alternative 1B. Much of this new $22 million payroll would be associated with the new sawmill that is projected to locate in Emmett by 2005. Another major change is shown in McCall-Donnelly where a $10.477 million increase in earnings occurs in Alternative 5. The alternative that has the largest overall impact on earnings is Alternative 1B, which generates a $40.796 million increase in earnings throughout seventeen Southeast Idaho communities.

Lifestyles

Under all alternatives, the 17-county/19-community cumulative effects area would continue to provide a diversity of lifestyles, ranging from urban recreationists to ranchers and millworkers. Consequently, no cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Attitudes, Beliefs and Values

Under all alternatives, the 17-county/19-community cumulative effects area would likely continue to exhibit widespread interest in natural resources and public land issues as well as diversity in attitudes, beliefs, and values about these resources and issues. Although many counties and communities have faced, and will likely continue to face, shifts and challenges, many are proud of their communities, counties and surroundings, and want to retain viable communities for the future. Consequently, no cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Social Organization

Under all alternatives, the 17-county/19-community cumulative effects area would continue to include communities with a variety of socio-economic resiliency ratings, and those ranging from urban settings to those centering on commodity-based lifestyles. Consequently, no cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Land-Use Patterns

Under all alternatives, the 17-county/19-community cumulative effects area would continue to provide a range of communities, with urban-centers, "bedroom communities," and those with a mix of managed and unmanaged wildlands. Consequently, no cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Civil Rights

Under all alternatives, it is likely that Idaho and the Ecogroup area will become racially more diverse (particularly in terms of Hispanic population increase), while remaining largely white and Anglo-Saxon. Although few data are available, there is a sense that the state's Hispanics use and related to National Forests in ways similar to Idaho's predominantly white population, and that this relationship would likely continue regardless of the Forest Plan alternative selected. Consequently, no cumulative impact from any of the seven Forest Plan Revision alternatives is anticipated.

Resource Commitments

This section contains effects disclosures that are required by federal law, regulation, or policy, and that generally apply to all the preceding resource area effects sections in this chapter.

UNAVOIDABLE ADVERSE EFFECTS

Forest Plan revision and Forest Plans do not produce unavoidable adverse effects because they do not directly implement any management activities that would result in such effects. The Forest Plans do, however, establishment management emphasis and direction for implementation of activities that may occur on National Forest System Lands in the planning period. If and when those activities occur, the application of Forest-wide, MPC, and Management Area standards and guidelines (as described in Chapter III of the revised Forest Plans) would limit the extent and duration of any resulting environmental effects. However, some unavoidable effects could still occur. These potential effects are described by resource area throughout Chapter 3 of the FEIS, primarily under Environmental Consequences, Effects Common To All Alternatives.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Short-term uses are those expected to occur for the planning period (10-15 years), including recreation use, timber harvest, and prescribed burning. Although these uses are not directly implemented by the Forest Plans, the potential for these uses are described in Forest Plan goals and objectives, both at the Forest-wide and Management Area levels (see Chapter III in the Forest Plans).

Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the planning period. Minimum management requirements, established by regulation (36 CFR 219.27), provide for maintenance of long-term productivity of the land. Minimum management requirements are contained in Forest-wide and Management Area standards and guidelines, and would be met under any alternative. They ensure that the long-term productivity of the land is not impaired by short-term uses.

Monitoring and evaluation, as described in the revised Forest Plans (Chapter IV), applies to all alternatives. A primary purpose of monitoring is to ensure that long-term productivity of the land is maintained or improved. If monitoring and evaluation show that Forest Plan standards and guidelines are inadequate to protect long-term productivity of the land, then the Plans will be adjusted (through amendment or revision) to provide for more protection or fewer impacts.

Although all alternatives are designed to maintain long-term productivity, there are differences among the alternatives in the long-term availability or condition of resources. There may also be differences among alternatives in long-term expenditures necessary to maintain or achieve desired conditions. The differences are discussed throughout the various sections of Chapter 3.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable commitments of resources are defined in Forest Service Handbook 1909.15, Environmental Policy and Procedures (9/21/92).

Irreversible commitments of resources mean the consumption or destruction of nonrenewable resources, such as minerals or cultural resources, or the degradation of resources such as soil productivity, which can be renewed only over long periods of time.

Irretrievable commitments of resources are opportunities foregone; they represent tradeoffs in the use and management of Forest resources. Irretrievable commitments of resources include expenditure of funds, loss of production, or restrictions on resource use. When one alternative produces less of a natural resource (such as timber volume) or offers fewer opportunities for use (such as non-motorized recreation) than another alternative, the difference represents an irretrievable commitment of resources.

The decisions made in forest plan revision do not represent actual irreversible and irretrievable commitments of resources. This is because forest planning identifies what kinds and levels of activities are appropriate in different parts of the Forest; it does not make project decisions. (For more information, see Chapter I of the Forest Plans, Decisions Made in a Forest Plan). The decision to irreversibly or irretrievably commit resources occurs at: (1) the time the Forest Service makes a project decision, such as approving a new trail or timber sale; (2) the time Congress acts on a recommendation to establish a new Wilderness or to include a stream segment in the Wild and Scenic River System; or (3) the time the Regional Forester designates a Research Natural Area.

ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Energy is consumed in the administration of natural resources from the National Forests. The main activities that consume energy are timber harvest, restoration activities including mechanical vegetation treatments and prescribed and wildland fire use, recreation use, road construction and reconstruction, range use, and administrative activities of the Forest Service and other regulatory agencies. Energy consumption is expected to vary only slightly by alternative. Those alternatives with higher potential for restoration activity, timber harvest and/or road construction, reconstruction and obliteration (5, 1B, 2, 7, and 3) are expected to have higher levels of energy use. Alternatives that have lower potential for these activities (4, 6) are expected to have slightly lower levels of energy use.

Several opportunities exist under all alternatives to provide for energy conservation or conversion from less plentiful fuels to more plentiful fuels. For example, car-pooling and combining trips saves fuels and wear and tear on the Forest fleet. The use of electronic communication devices for sharing information rather than scheduling meetings at one location saves energy spent on travel. Improving energy efficiency of government buildings can conserve energy. More energy-efficient equipment for all activities like timber harvesting, road construction and reconstruction or road maintenance can be required. More energy-efficient management methods can be explore and implemented as well.

PRIME FARMLAND, RANGELAND, AND FORESTLAND

No prime farmland, rangeland, or forestland has been identified in the planning area. Forest Plan revision or the Forest Plans would not directly affect such lands, although implementation of the Plans could have indirect effects. Regardless of the alternative selected for implementation, National Forest System lands would be managed with sensitivity to the values of any adjacent private or public lands.

EFFECTS ON THE HUMAN ENVIRONMENT

Effects on the human environment are documented throughout Chapter 3 of this EIS. Further documentation can be found in the project record.

Environmental Justice

Executive Order 12898 (59 Fed. Register 7629, 1994) directs federal agencies to identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

Idaho is becoming racially more diverse, although the state's population remains largely white and Anglo-Saxon. In 1995, non-Hispanic whites comprised 91.4 percent of Idaho's citizens and Hispanics 6.8 percent, with African-Americans, Native Americans and others comprising the remainder. However, the Hispanic population has increased by about 50 percent from 1990 to 1996 (Idaho Commission on Hispanic Affairs, 1999). Canyon County, included in the SWIEG socioeconomic assessment area, includes 25 percent of the state's Hispanic population (Idaho Dept. of Commerce, 1998d). Although there are few data available, there is a sense that Idaho Hispanics use and relate to National Forests in ways similar to the State's predominantly white population (Ramirez, 1999). Consequently, it is not likely that any alternative would adversely effect Hispanic populations in ways different from other populations.

There is no information available to determine how African-American populations would be affected by any alternative. However, based on past experience within the Ecogroup, it is unlikely that African-American populations would be adversely affected by any alternative, because African-Americans have typically been involved in Forest Service activities as individuals or families, rather than as a distinct population.

THREATENED AND ENDANGERED SPECIES

Potential effects to species listed under the Endangered Species Act can be found in Chapter 3 of this EIS (Soil, Water, Riparian, and Aquatic Resources, Wildlife Resources, and Botanical Resources sections) and in the Biological Assessment that was completed for Forest Plan Revision. Management direction to protect these species, or to provide for their habitats, can be found in Chapter III of the revised Forest Plans (TEPC Species section and Management Areas).

WETLANDS AND FLOODPLAINS

There are numerous amounts of wetlands and floodplains spread throughout the planning area, with estimates of 25,000 miles of perennial and intermittent streams, their associated floodplains, and 34,000 acres of lakes, reservoirs, and wetlands. Forest Plan revision and Forest Plans do not directly implement any management activities that would result in loss of wetland or floodplains. Revised Forest-wide management direction identifies the need to restore currently degraded wetlands and floodplains, and provides a broad spectrum of standards and guidelines designed to protect soil, water, riparian, and aquatic resources. The goals and intent of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) would be met through compliance with this direction. Documentation for this conclusion can be found in the FEIS, Chapter 3, Soil, Water, Riparian, and Aquatic Resource section and in the Forest Plans, Chapter 3, Management Direction.

CONFLICTS WITH OTHER AGENCY OR GOVERNMENT GOALS OR OBJECTIVES

Contact, review, and public involvement with other federal and state agencies indicate no major conflicts between this Forest Plan revision effort and the goals and objectives of other governmental entities.