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.

Reference Conditions

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).

HRV of Size Class - 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

<u>*HRV of Old Growth*</u> - 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.

HRV of Snags and Down Logs - 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.

<u>*Alternative 2*</u> – 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).

<u>*Alternative 3*</u> – 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.

<u>*Alternative 4*</u> – 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.

<u>*Alternative 5*</u> – 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.

<u>*Alternative 6*</u> – 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							
PVG	Size/Canopy Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
*PVG 10	G/F/S/S Med. Low Med. Mod. Med. High	15.0 0 5.0 6.0	21.0 0 18.0 2.0	14.0 0 18.0 2.0	6.0 0 18.0 2.0	10.0 0 5.0 6.0	10.0 0 18.0 2.0	22.0 0 16.0 4.0
PVG 11	G/F/S/S Large Low Large Mod. Large High	16.0 9.0 5.0 0	16.0 1.0 20.0 0	11.0 2.0 25.0 0	5.0 2.0 25.0 0	16.0 13.0 7.0 0	8.0 2.0 24.0 0	15.0 3.0 23.0 0
PVG	Boise National Forest							
PVG	Size/Canopy Classes	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
PVG 1	G/F/S/S Large Low Large Mod. Large High	2.0 47.0 0 0	2.0 69.0 0 0	2.0 91.0 0 0	1.0 91.0 0 0	2.0 24.0 0 0	1.0 81.0 0 0	6.0 69.0 0 0
PVG 2	G/F/S/S Large Low Large Mod. Large High	6.0 8.0 51.0 0	3.0 60.0 11.0 0	3.0 68.0 12.0 0	2.0 68.0 12.0 0	8.0 4.0 26.0 0	2.0 65.0 11.0 0	7.0 21.0 31.0 0
PVG 3	G/F/S/S Large Low Large Mod. Large High	11.0 0 23.0 0	10.0 5.0 27.0 0	7.0 6.0 35.0 0	4.0 6.0 35.0 0	12.0 0 20.0 0	5.0 6.0 35.0 0	9.0 2.0 29.0 0
PVG 4	G/F/S/S Large Low Large Mod. Large High	5.0 0 20.0 0	4.0 1.0 26.0 0	4.0 1.0 33.0 0	3.0 1.0 33.0 0	6.0 0 20.0 0	3.0 1.0 29.0 0	14.0 1.0 28.0 0
PVG 5	G/F/S/S Large Low Large Mod. Large High	7.0 9.0 57.0 0	3.0 26.0 49.0 0	3.0 29.0 55.0 0	3.0 29.0 55.0 0	10.0 4.0 29.0 0	3.0 27.0 49.0 0	6.0 10.0 41.0 0
PVG 6	G/F/S/S Large Low Large Mod. Large High	11.0 0 28.0 0	9.0 0 42.0 0	7.0 0 56.0 0	4.0 0 56.0 0	12.0 0 20.0 0	5.0 0 46.0 0	9.0 0 33.0 0
PVG 7	G/F/S/S Large Low Large Mod. Large High	11.0 3.0 7.0 0	12.0 1.0 19.0 0	9.0 1.0 20.0 0	5.0 1.0 20.0 0	10.0 7.0 13.0 0	7.0 1.0 19.0 0	15.0 1.0 19.0 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 Med. Low Med. Mod. Med. High	15.0 0 5.0 6.0	21.0 0 18.0 2.0	14.0 0 18.0 2.0	6.0 0 18.0 2.0	10.0 0 9.0 11.0	10.0 0 18.0 2.0	22.0 0 16.0 4.0
PVG 11	G/F/S/S Large Low Large Mod. Large High	16.0 9.0 5.0 0	16.0 1.0 20.0 0	11.0 2.0 25.0 0	5.0 2.0 25.0 0	16.0 13.0 7.0 0	8.0 2.0 25.0 0	14.0 2.0 25.0 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.

Payette National Forest - 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

Sawtooth National Forest - 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.

<u>*Payette National Forest*</u> **-** 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

Boise National Forest – 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

<u>*Sawtooth National Forest*</u> - 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	0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9
	Large Mod.	5.8	- 1.2	- 6.2	- 7.2	- 7.2	- 2.2	- 7.2	- 6.2
	Large High	3.9	- 7.1	- 4.1	- 4.1	- 4.1	- 8.1	- 4.1	- 5.1
10*	Medium Low	2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1	+ 2.1
	Medium Mod.	28.3	+23.3	+16.3	+10.3	+10.3	+23.3	+10.3	+12.3
	Medium High	6.3	+ 0.3	- 1.7	+ 4.3	+ 4.3	+ 0.3	+ 4.3	- 2.7
11	Large Low	1.3	- 7.7	+ 0.3	- 0.7	- 0.7	-11.7	- 0.7	- 1.7
	Large Mod.	2.2	- 2.8	-17.8	-22.8	-22.8	- 4.8	-21.8	-20.8
	Large High	0.8	+ 0.8	+ 0.8	+ 0.8	+ 0.8	+ 0.8	+ 0.8	+ 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 Large Moderate Large High	7.4 10.6 0	-83.6 +10.6 0	Out
2	Large Low Large Moderate Large High	2.7 8.2 6.4	-65.3 - 3.8 + 6.4	Out
3	Large Low Large Moderate Large High	0.7 10.1 8.0	- 5.3 -24.9 + 8.0	Out
4	Large Low Large Moderate Large High	0.5 8.7 3.7	- 0.5 -24.3 + 3.7	Out
5	Large Low Large Moderate Large High	1.2 8.2 4.1	-27.8 -46.8 + 4.1	Out
6	Large Low Large Moderate Large High	0.9 10.0 11.5	+ 0.9 -46.0 +11.5	Out
7	Large Low Large Moderate Large High	0.4 4.9 7.3	- 0.6 -15.1 + 7.3	Out
8/9	Large Low Large Moderate Large High	0.2 4.8 12.3	+ 0.2 - 8.2 + 4.3	Out
10*	Medium Low Medium Moderate Medium High	0.9 17.0 11.1	+ 0.9 - 1.0 + 9.1	Out
11	Large Low Large Moderate ge High	0.4 3.3 4.7	- 1.6 -21.7 + 4.7	Out

*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	0.7	-90.3	Out
	Large Moderate	3.4	+ 3.4	
	Large High	0	0	
2	Large Low	1.0	-64.0	Out
	Large Moderate	16.8	- 4.8	
	Large High	3.3	+ 3.3	
3	Large Low	1.4	- 4.6	Out
	Large Moderate	16.5	-18.5	
	Large High	1.7	+ 1.7	
4	Large Low	1.0	0	Out
	Large Moderate	10.7	-22.3	
	Large High	2.1	+ 2.1	
5/6		N/A	N/A	N/A
7	Large Low	0.5	- 0.5	Out
	Large Moderate	3.9	-16.1	
	Large High	0.8	+ 0.8	
8/9		N/A	N/A	N/A
10*	Medium Low	3.4	+ 3.4	**In**
	Medium Moderate	18.4	+ 0.4	
	Medium High	1.4	- 0.6	
11	Large Low	0.1	- 1.9	Out
	Large Moderate	0.5	-24.5	
	Large High	0.2	+ 0.2	

*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

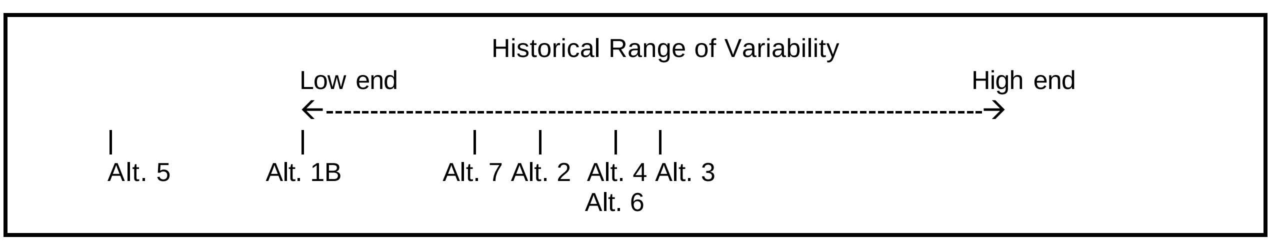


Figure V-6. Relationship of Desired Conditions to Historical Range of Variability by Alternative for Pinyon-Juniper

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% 11-20% >21%	32.9% 48.1% 19.0%	-17.1% +23.1% - 6.0%	-2.1% +8.1% **IN**	- 1.1% +15.1% -14.0%	- 1.1% +15.1% -14.0%	-17.1% +23.1% **IN**	+2.9% +13.1% -11.1%	**IN** + 8.1% - 1.0%
Mountain Big Sagebrush with Chokecherry, Serviceberry, Rose	0-10% 11-20% >21%	25.2% 37.0% 37.8%	-24.8% +12.0% +12.8%	- 9.8% **IN** + 7.8%	- 8.8% + 4.0% + 4.8%	- 8.8% + 4.0% + 4.8%	-24.8% +12.0% +12.8%	**IN** + 2.0% **IN**	**IN** **IN** + 7.8%
Mountain Big Sagebrush with Snowberry	0-10% 11-20% >21%	25.0% 43.9% 31.0%	-25.0% +18.9% + 6.0%	-10.0% + 3.9% + 1.0%	- 9.0% +10.9% - 2.0%	- 9.0% +10.9% - 2.0%	-25.0% +18.9% + 6.0%	**IN** + 8.9% **IN**	- 5.0% + 3.9% + 1.0%
Mountain Big Sagebrush with Bitterbrush	0-10% 11-20% >21%	11.4% 35.0% 53.6%	-38.6% +10.0% +28.6%	-23.6% **IN** +23.6%	+22.6% + 2.0% +20.6%	+22.6% + 2.0% +20.6%	-38.6% +10.0% +28.6%	-13.6% **IN** +13.6%	-18.6% **IN** +23.6%
Basin Big Sagebrush	0-10% 11-20% >21%	42.1% 48.5% 9.5%	- 7.9% +23.5% -15.5%	**IN** + 8.5% - 5.5%	+ 8.1% +15.5% -23.5%	+ 8.1% +15.5% -23.5%	- 7.9% +23.5% **IN**	+12.1% +13.5% -20.5%	+ 2.1% +8.5% -10.5%
Low Sagebrush	0-10% 11-20% >21%	35.7% 57.1% 7.3%	-54.3% +47.1% + 7.3%	-54.3% +47.1% + 7.3%	-54.3% +47.1% + 7.3%	-54.3% +47.1% + 7.3%	-54.3% +47.1% + 7.3%	-54.3% +47.1% + 7.3%	-54.3% +47.1% + 7.3%
Wyoming Big Sagebrush	0-10% 11-20% >21%	55.5% 41.0% 3.4%	+ 5.5% +16.0% -21.6%	+25.5% + 6.0% +26.6%	+30.5% + 1.0% -36.6%	+30.5% + 1.0% -36.6%	**IN** +16.0% **IN**	+30.5% + 1.0% -36.6%	+25.5% + 6.0% +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.

<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 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).

<u>*Indirect Effects*</u> **–** 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.

<u>*Boise National Forest*</u> - 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.

<u>*Sawtooth National Forest*</u> - 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.

<u>*Payette National Forest*</u> - 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.

Boise National Forest - 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.

<u>*Fifth Decade*</u> **-** 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.

<u>*Synthesis of Results*</u> - 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

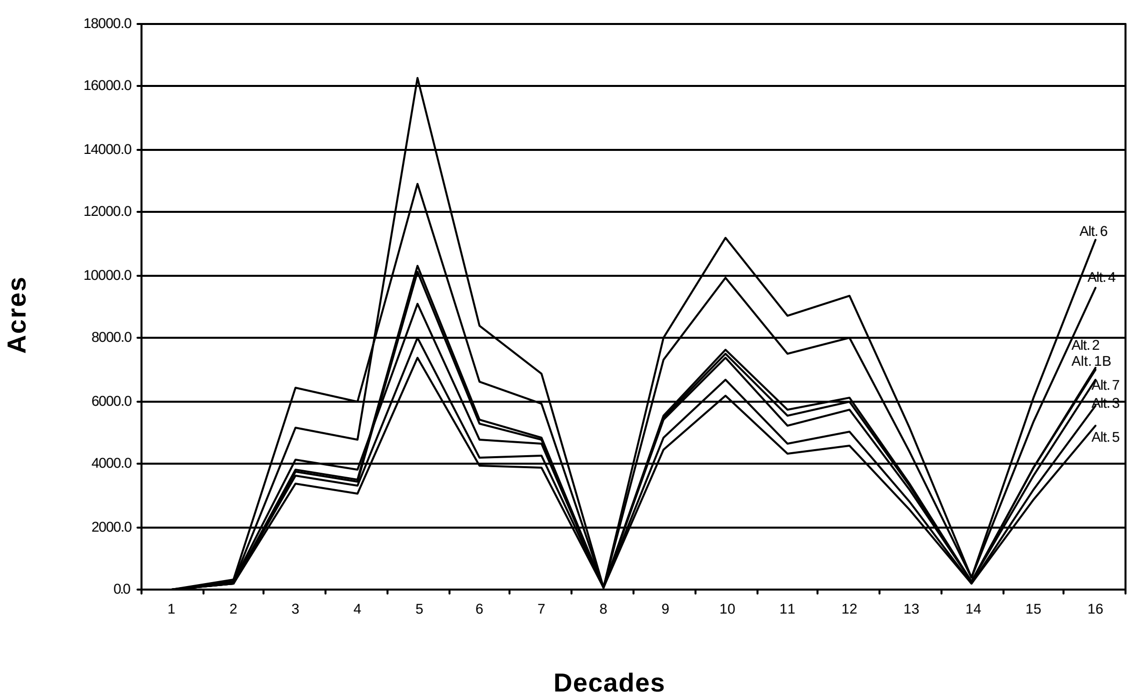
In summary, it appears Alternative 7 is the best alternative for meeting the DC for the most vegetation types in the shortest timeframes. Alternative 7 is followed in order by Alternatives 2, 6, 3, 5, 1B, and 4. For falling the closest to HRV, Alternatives 3, 7, and 1B appear to be the overall best, 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

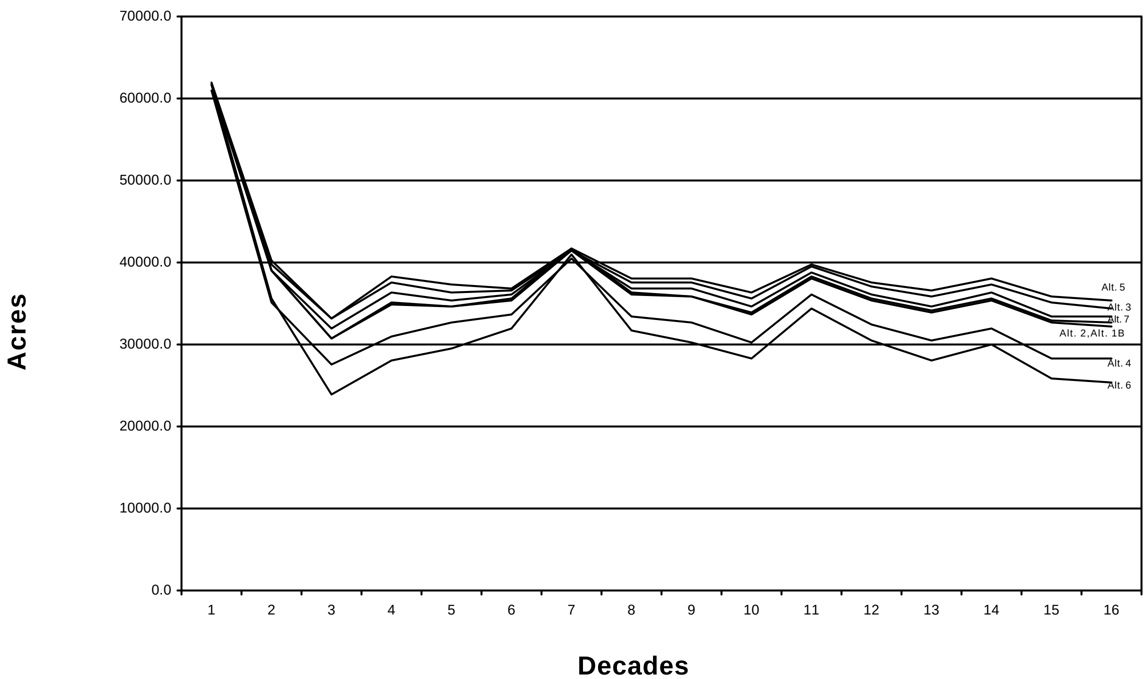


The only modeled disturbance that can move acres into this class is failed fire suppression. Therefore, these fluctuations are representative of the fluctuations in escaped wildfires. The lows are years with little to no wildfires, and the highs are the years with large amounts of acreage affected by 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.

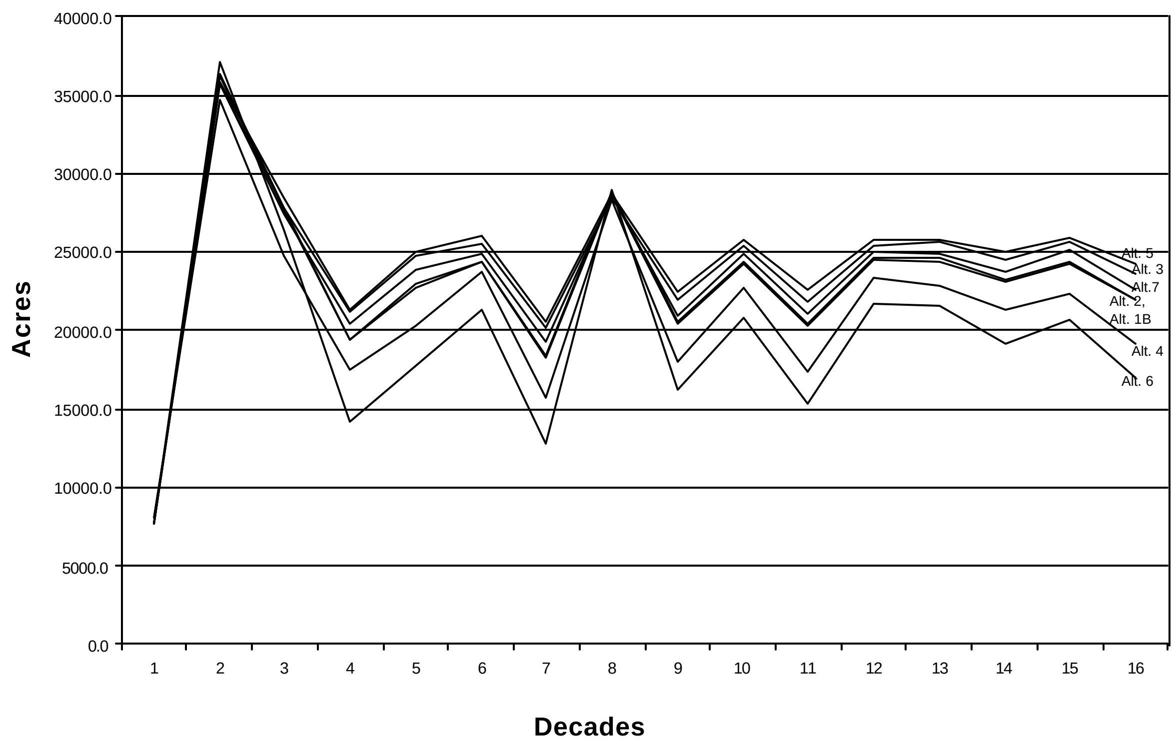
Figure V-8. Acres over Time in 0-10 Percent Canopy Cover Class for Mountain Big Sagebrush - Boise National Forest



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

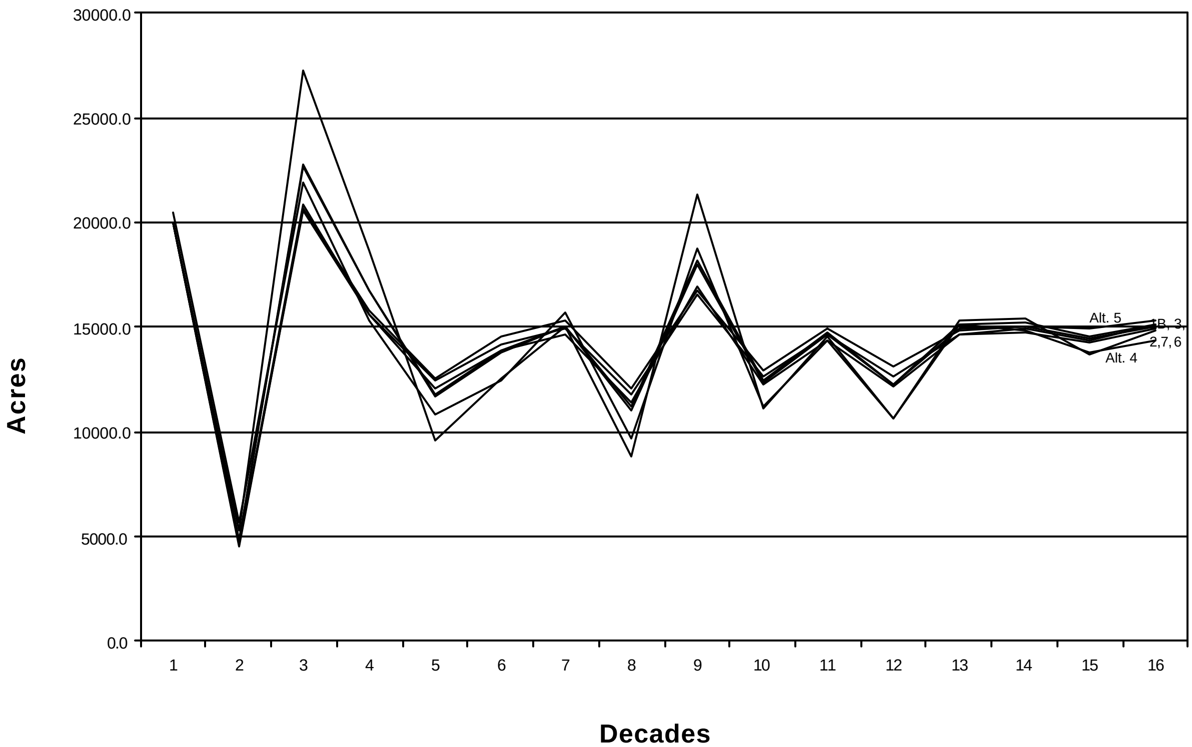
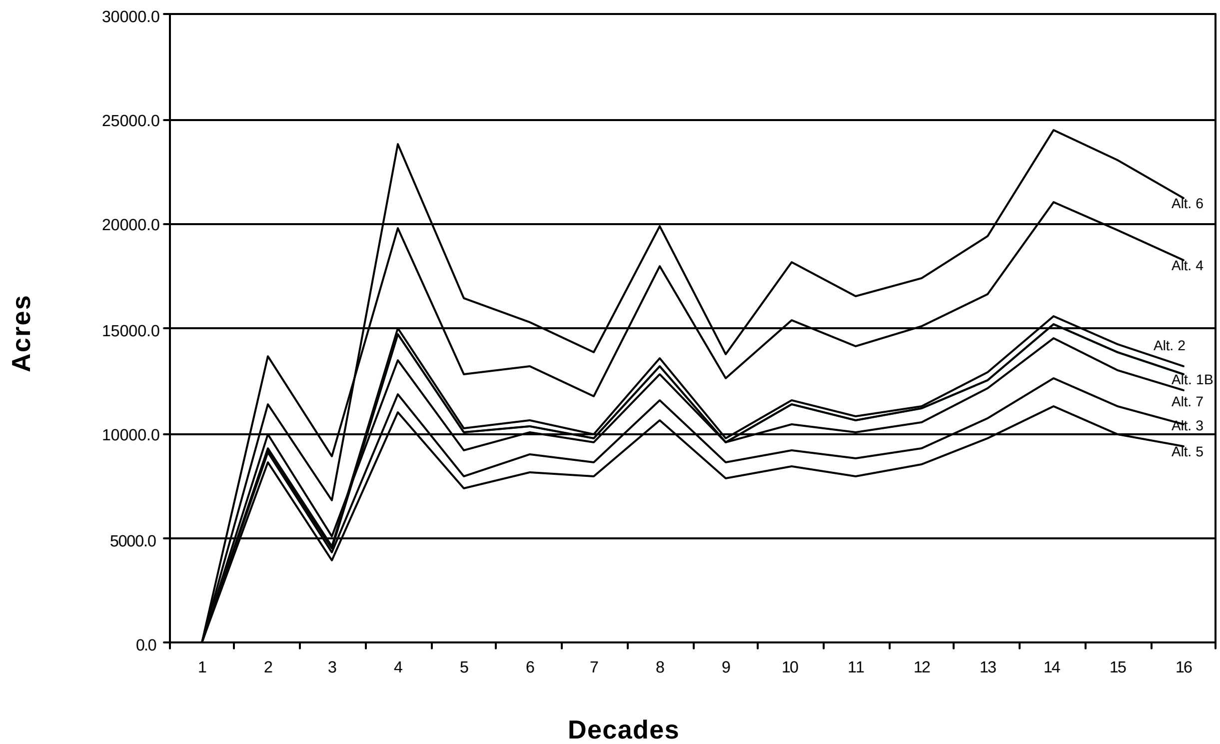


Figure V-11 displays more variation between the alternatives in the very high canopy cover class. Alternative 6 has the highest amount in the very high class, followed in order by Alternatives 4, 2, 1B, 7, 3, and 5. When compared with Figure V-7, it is apparent that as the very high canopy cover is at 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.

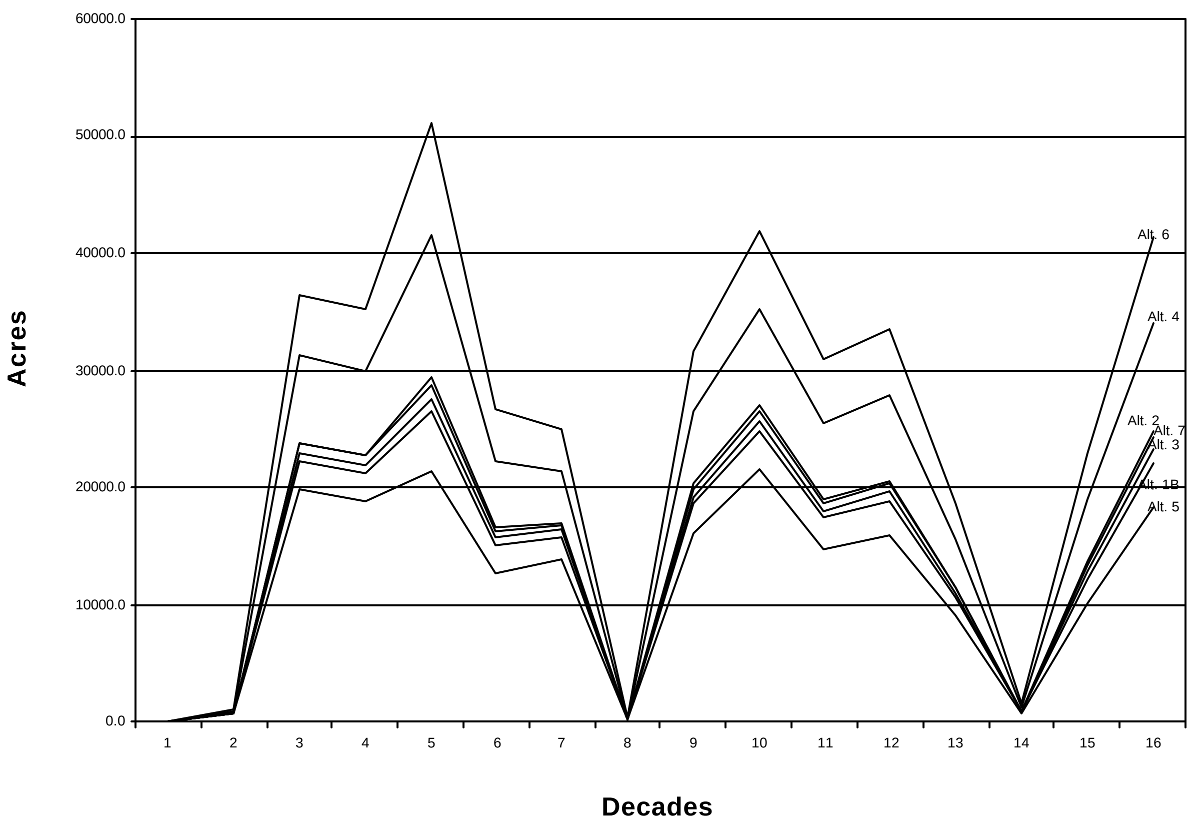
Figure V-11. Acres over Time in >31 Percent Canopy Cover Class for Mountain Big Sagebrush - Boise National Forest



<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

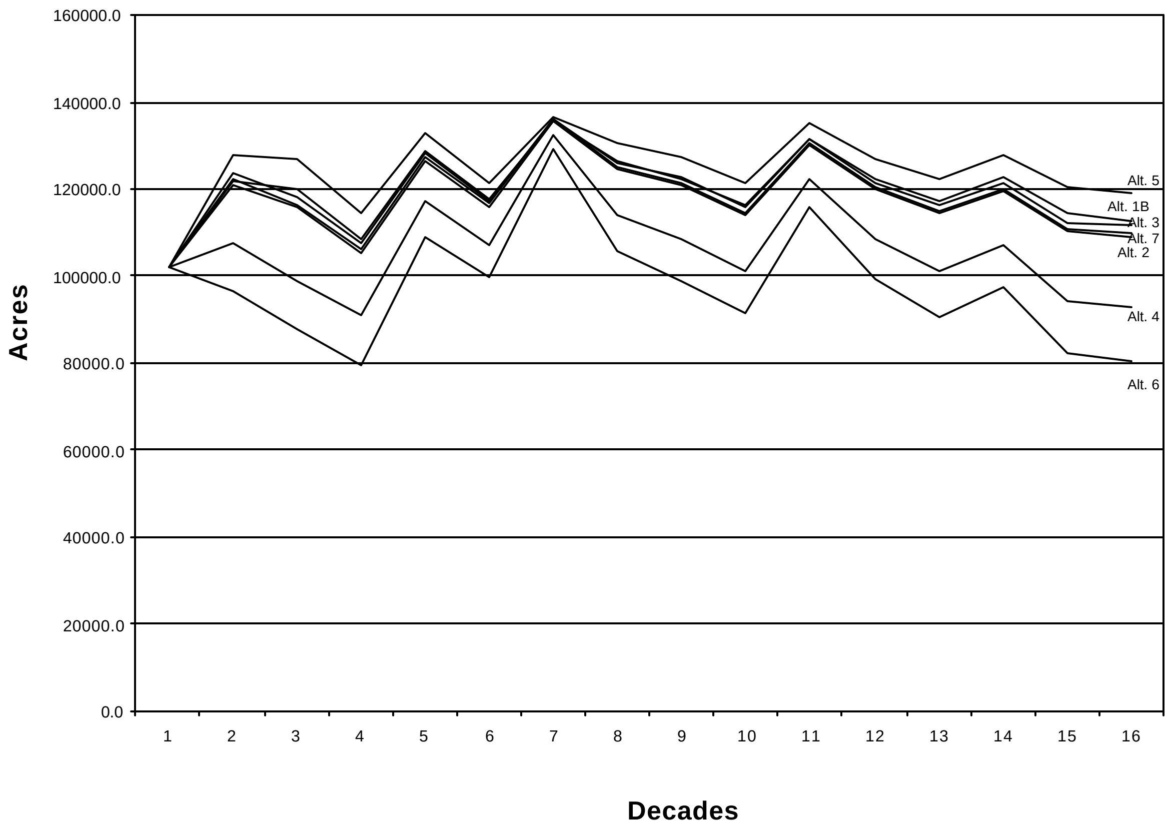
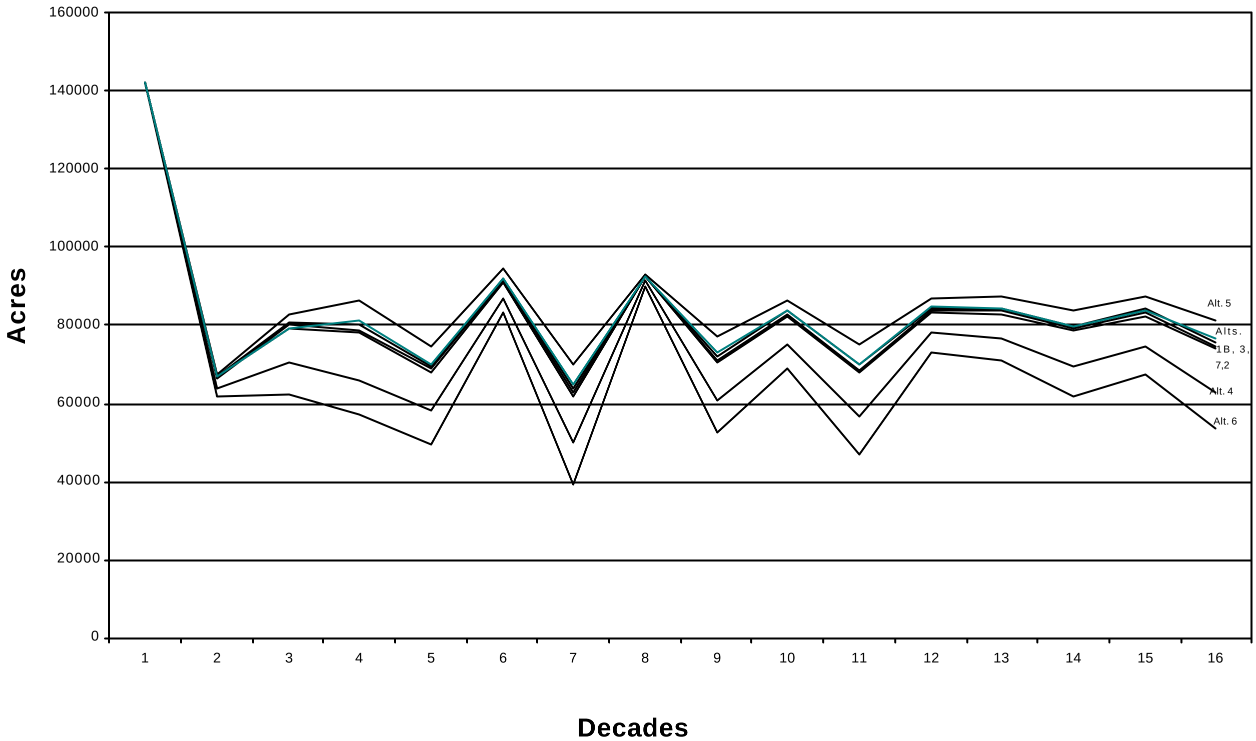


Figure V-14 displays the temporal changes in the medium canopy cover class, which starts with 47 percent of the total mountain big sagebrush acres in this class. By the second decade these acres have dropped off to 22 percent of the total mountain big sagebrush acres for all alternatives. After this 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

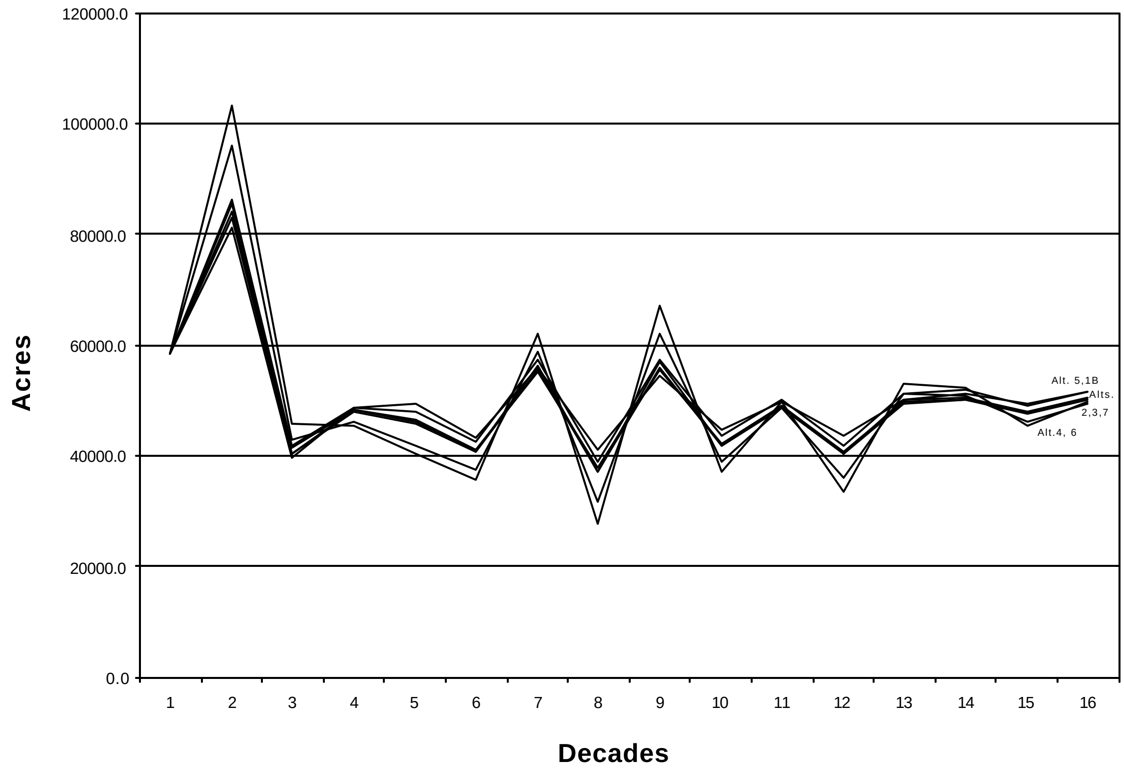
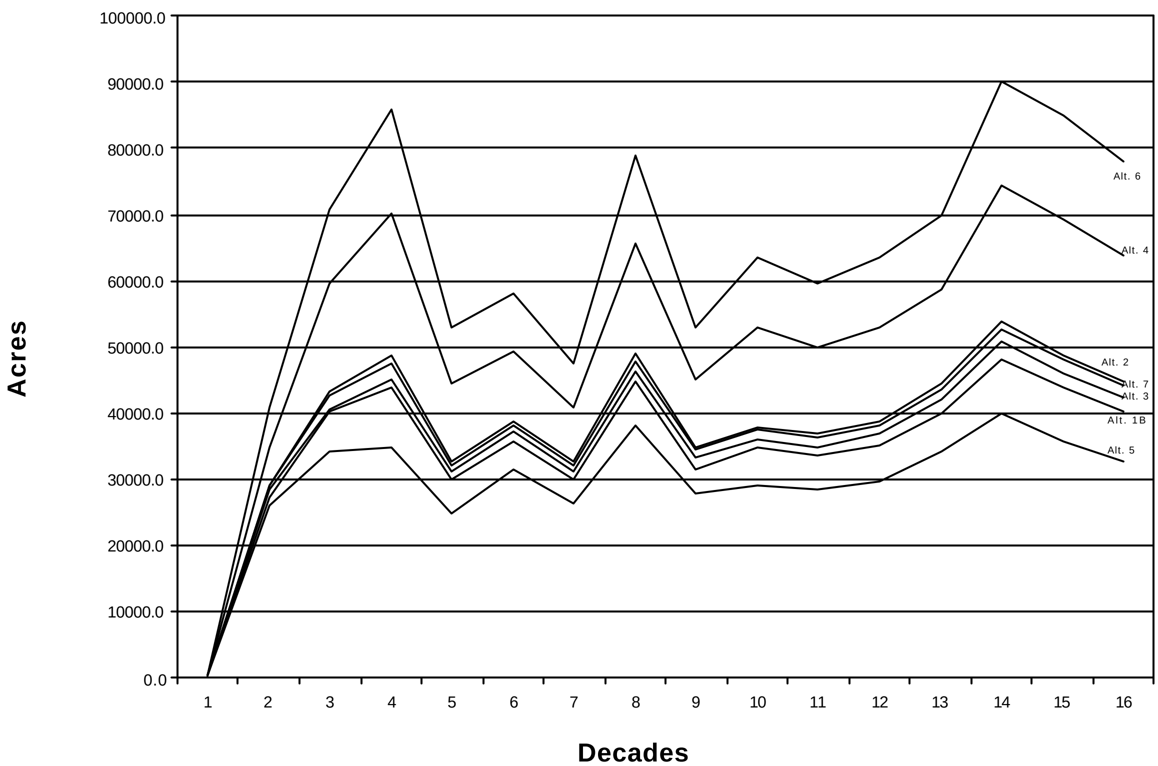


Figure V-16 displays more variation between the alternatives in the very high canopy cover class. Alternative 6 has the highest amount in the very high class, followed in order by Alternatives 4, 2, 7, 3, 1B, and 5. When compared with Figure V-12, it is apparent that after the very high canopy cover 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.

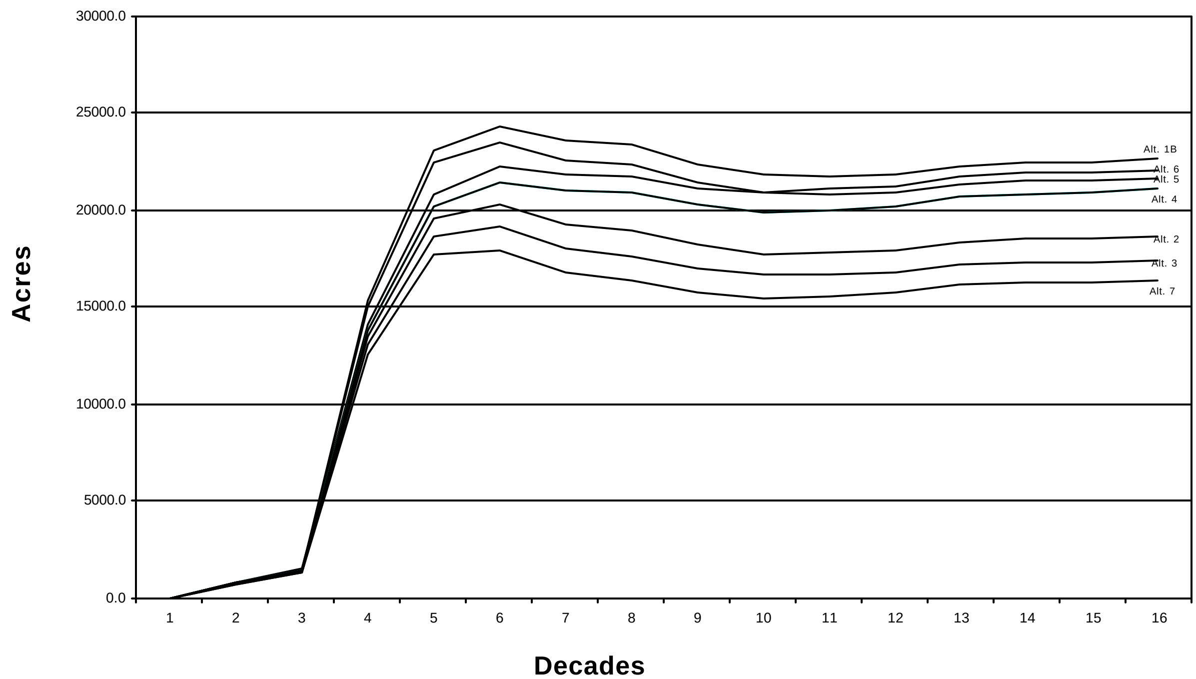
Figure V-16. Acres over Time in >31 Percent Canopy Cover Class for Mountain Big Sagebrush - Sawtooth National Forest



<u>*Sawtooth National Forest, Climax Aspen*</u> - 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.

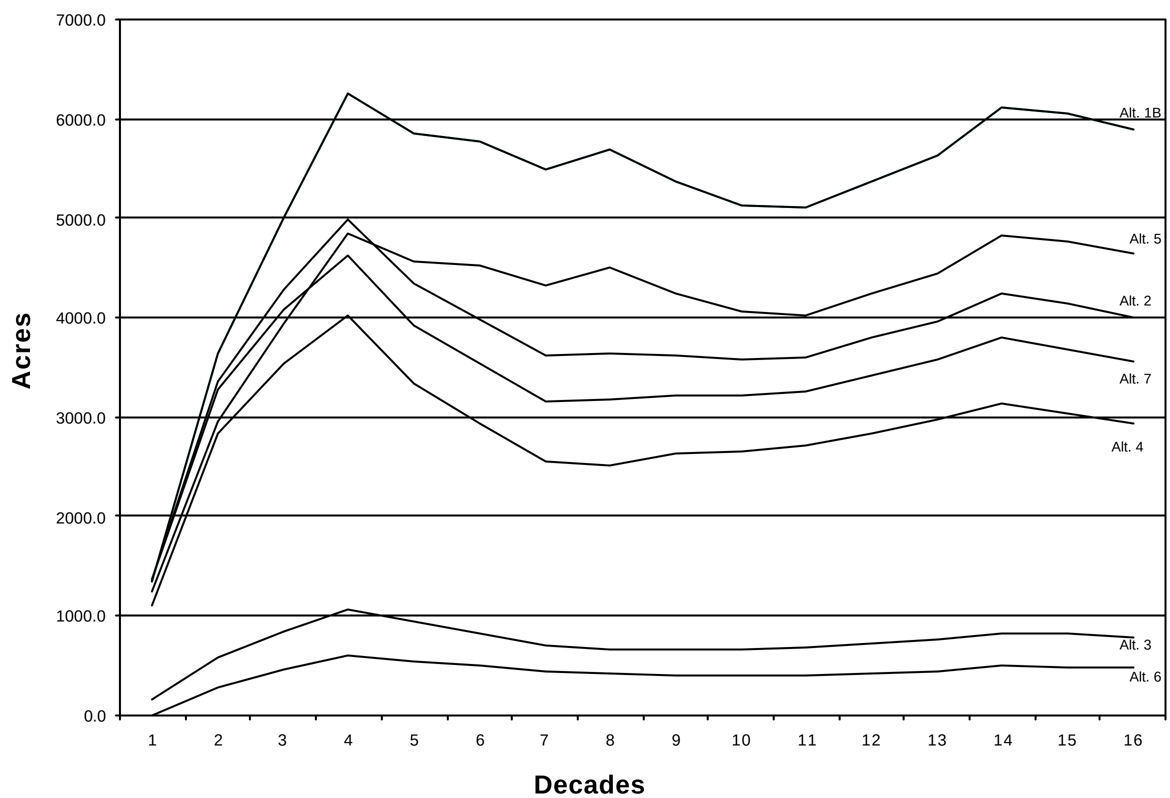
Figure V-17. Acres over Time in Mature Canopy/Size Cover Class for Climax Aspen-Sawtooth National Forest



<u>*Sawtooth National Forest, Low Sagebrush*</u> - 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.

<u>*Sawtooth National Forest*</u> - 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.

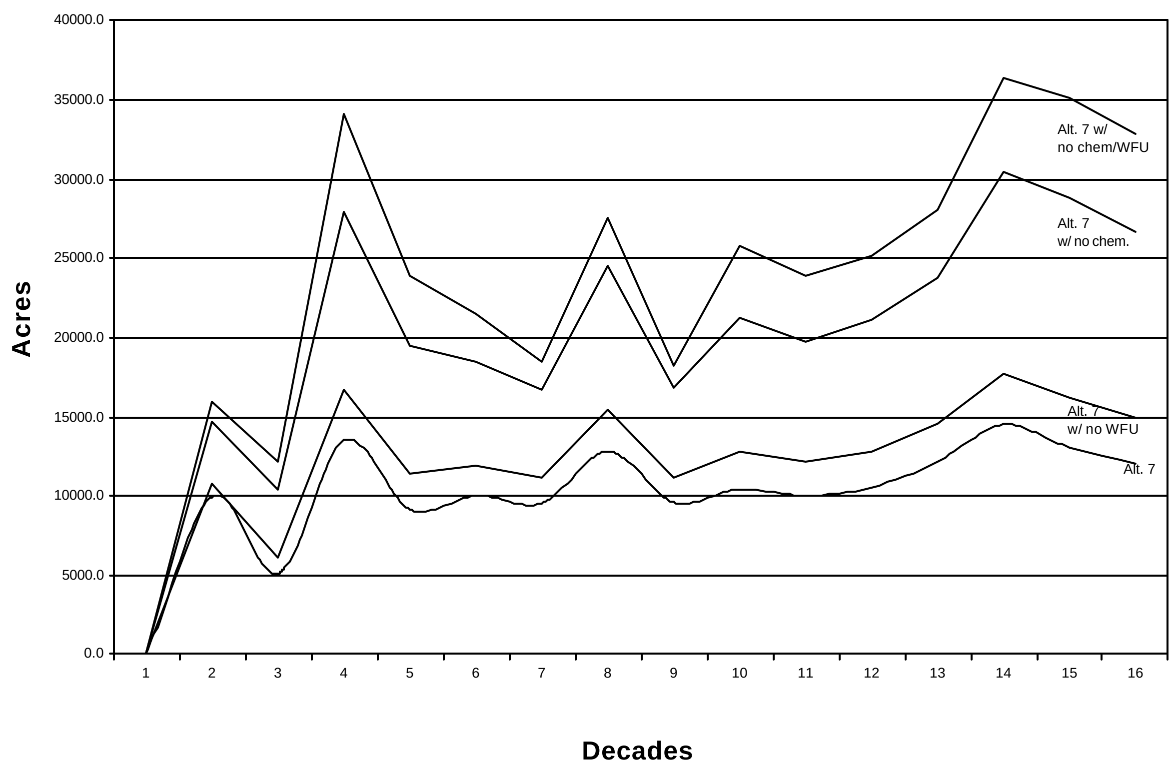
In designing the model parameters for non-forested vegetation, each alternative was modeled as to what were assumed to be predicted levels of management activities to implement the alternative. However, given current levels of budget and personnel, some of the management activities may have been overestimated 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.

Sawtooth National Forest - 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

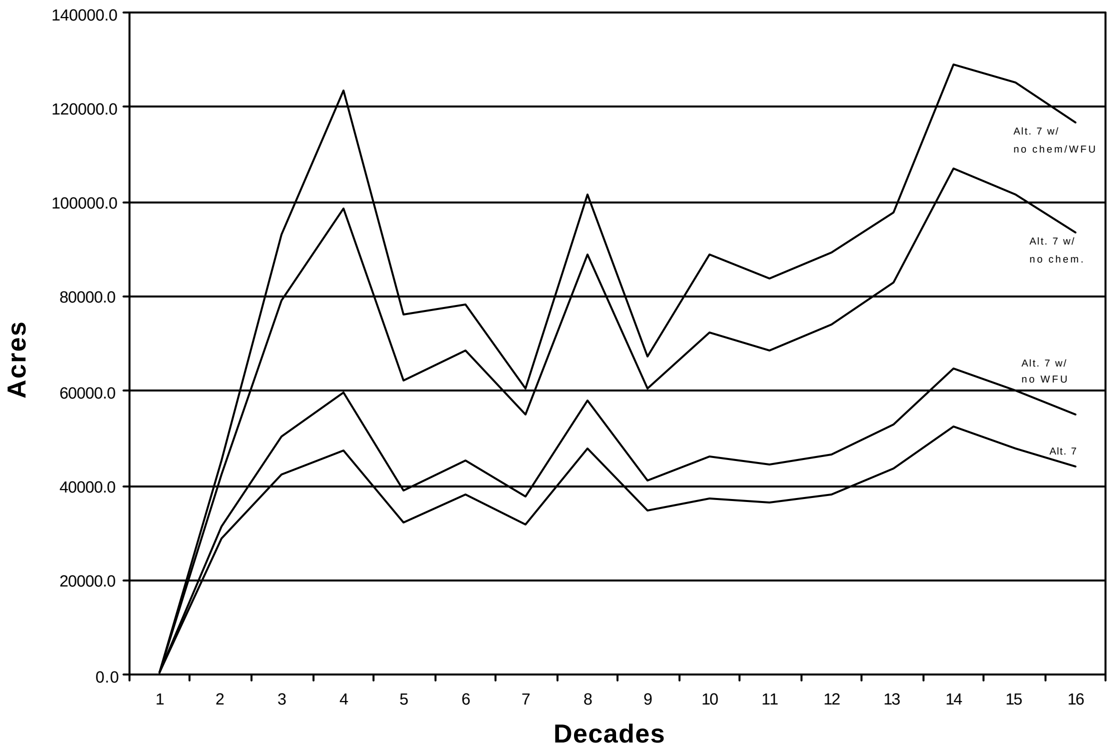
Alternative 7, the effect on the outcomes are small. The outcomes for basin big sagebrush, mountain big sagebrush, low sagebrush, mountain big sagebrush with bitterbrush, and pinyon-juniper remain unchanged when wildland fire use is eliminated from Alternative 7. Mountain big sagebrush with chokecherry, 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).