INTERMOUNTAIN REGIONAL ASSESSMENT

Properly Function Condition (PFC)

June 3, 1996 Version

This assessment is a practical exercise to implement the use of the Properly Functioning Condition (PFC) Process developed by a Regional Team as directed by the Board of Directors on March 8, 1996. See Final Draft "Properly Functioning Condition" Phase One. The assessment was conducted to determine what is and what is not in a PFC at the Regional scale. This includes an estimate of risk in response to biological and physical attributes.

The process included an evaluation of each subject area identified in the Final Draft "Properly Functioning Condition" Phase One paper. Original team members contributed to this assessment. Each subject area was assessed at a Regional scale using the matrix developed in the final draft.

SUBJECT AREA: Alpine

A. Background

Alpine areas occupy a relatively small area within the Region. It exists at high elevations above tree line and is most common in the Wind River, Uinta, and Sawtooth mountain ranges. They are very important watershed areas. Even slight disturbance of these alpine areas is significant as recovery is very slow because of the harsh environment. Alpine areas are home to pikas, ptarmigan, and (where there are cliffs) golden eagles and peregrine falcons.

B. Assessment

Improper grazing and human traffic impacts are causing the greatest damage to vegetation on these areas. Approximately one-half of alpine areas in the Region are considered to be in a properly functioning condition. Accelerated erosion is the main concern for those areas that are at risk or are not properly functioning. Such erosion is cummulative downward through other parts of the watersheds.

C. Risk

Regionally the risk associated with this ecosystem is low. However, at the landscape level the risk can be exceptionally high. Overuse by domestic livestock and humans can increase the loss of those portions of the type still remaining in a properly functioning condition.

SUBJECT AREA: Subalpine Timberline Forests and Woodlands

A. Background

This high elevation ecosystem occurs throughout the Region, but is most important in s.w. Idaho and within the Greater Yellowstone Area. Many attributes make this a significant type, but the five-needled pines in particular are a valuable food source for wildlife (especially grizzly bear). Whitebark pine is noted for its production of relatively large seeds, which wildlife value as a food source. Whitebark pine reproduces poorly, because of harsh site conditions, sporadic seed production, low germination rates and consumption of viable seed by wildlife. Mountain pine beetle and white pine blister rust are significant agents of change affecting tree and seed viability.

B. Assessment

Most whitebark pine trees and stands are older aged. Competition with other tree species (e.g. subalpine fir), seed loss and tree mortality caused by mountain pine beetle and white pine blister rust reduce species viability. All of which, affect the ability of this tree species to regenerate. Upper timberlines dominated by limber or bristlecone pine are less important to wildlife because the pine seeds are smaller in size. However, they are subject to loss from the effects of mountain pine beetle and white pine blister rust.

C. Risk

Since these species occupy limited habitat; the risk associated with a continuing decline of species such as whitebark pine is high. Bear populations could be negatively impacted if the food source is depleted and ptarmigan populations may suffer if hiding cover is reduced.

SUBJECT AREA: Engelmann Spruce - Subalpine Fir

A. Background

This ecosystem is found primarily in southern Idaho, northwestern Wyoming, and Utah, with lesser amounts in Nevada. It ranges from pure Engelmann spruce to pure subalpine fir forests. In most instances, however, it occurs as a mixed species forest. Engelmann spruce is characterized as long-lived (>300 years), found on cool moist to wet sites or in riparian areas. It has shallow roots (susceptible to windthrow); and most stands are in a multi-canopy structural condition. It regenerates best in partial shade on bare soil microsites.

Subalpine fir is similar in ecology but is shorter-lived (100-150 years). It regenerates readily in shaded conditions on humus and duff as well as bare mineral soil. The Engelmann spruce-subalpine fir type provides elk wallow sites and habitat for many late-seral forest dependant wildlife species; such as woodpeckers and blue grouse.

Blue spruce is included in our assessment. Blue spruce is primarily in riparian and lowland areas. Some of the most extensive areas of blue spruce are on the Dixie National Forest.

B. Assessment

Structural stages are not balanced throughout the Region in this type. The majority of the type is in mature to old age classes, with few areas in seedling/sapling sized Engelmann spruce. Composition of younger stands is weighted towards subalpine fir. There is a dynamic cycle

between spruce and subalpine fir dominance depending on stand conditions and insect activities. Current and recent Engelmann spruce beetle epidemics have affected extensive landscapes favoring a shift to more dominance by subalpine fir as mature spruces have been killed. On the Payette, Dixie and Manti-LaSal National Forests, spruce beetle outbreaks have resulted in spruce mortality exceeding 80 percent in many areas. Spruce beetle caused tree mortality has been above endemic levels within the Region since the mid-1980's. Much of the affected area on the Payette National Forest burned, as a result of wildfires in 1994. Stands of dense and older-aged spruce in diameter classes susceptible to spruce beetle are found on many of the National Forests in Utah, Idaho and Wyoming. Subalpine fir mortality is also at epidemic levels in the three previously listed states due to a complex of insects and disease pathogens. Extended drought in the late 80's and early 90's stressed many subalpine fir; leading to increased insect and disease activity. Subalpine fir and spruce mortality often occurs on the same stands, creating significant changes in structures and composition of the spruce/fir forests. Historically, fire regimes of mixed severity occurred on a 50 to 80 year cycle, with lethal fires every 100 to 300 years. Because of increased mortality in these older age class forests; the potential for stand replacing fires has increased. However, current conditions within the Region are within the historical range of variation for the type.

C. Risk

Potential major changes in stand structure and composition are high for this type. Changes will eventually occur as a result of large, stand-replacing fires, insect epidemics, or a combination of the two throughout much of the spruce/fir range. In addition, losses of this cover type in riparian areas may adversely affect water quality and wildlife habitat. On uplands there may also be major shifts from late-seral to early-seral forests in spruce beetle epidemic areas such as portions of the Manti-LaSal and Dixie National Forests. Closed canopy dependant wildlife such as blue grouse will be adversely affected as structures change to early-seral conditions.

SUBJECT AREA: Quaking aspen

A. Background

Quaking aspen is distributed throughout the Region with the largest concentration in eastern Idaho, western Wyoming, and Utah. As a generality, physiological age varies from 60 to 120 years. Aspen is considered an early seral species on most sites but may form an edaphic climax on others. Fire has been the most important disturbance factor influencing changes in structural stages and composition and minimizing dominance by conifer species. Non-lethal fires at lower elevations, and stand replacement fires at higher elevations, historically regenerated this species and kept these stages in balance. The fire return interval is less frequent today compared to historical averages. Quaking aspen provides great benefit to wildlife and livestock as forage and cover. Quaking aspen maintains watershed condition, enhances soil productivity, and provides aesthetically pleasing values to people. Most previous regeneration treatments in quaking aspen have occurred at a stand level. This is at a scale too small to have much benefit on quaking aspen at a landscape or larger scale.

B. Assessment

Approximately 85 percent of the quaking aspen in the Region are in a mid to late seral stage. Further, many areas are being dominated by conifers through plant succession thereby further reducing quaking aspen area. Approximately 41 percent of quaking aspen in portions of Idaho have succeeded to other vegetation types compared to historical conditions. In one watershed on the Targhee National Forest, 95 percent of the quaking aspen type has succeeded to other vegetative types compared to conditions in 1910. Similar decreases in quaking aspen area is occurring Region-wide. Exclusion of fire in combination with livestock grazing have contributed to this situation. Livestock grazing over the past 100 years reduced accumulations of fine fuels (shrubs and herbaceous layers), resulting in a much lower spread of fire. In most instances, aspen regeneration has not been successful throughout the Region because of heavy grazing by wild and domesticated ungulates. Previous silvicultural treatments at the stand scale have been too small to effectively maintain quaking aspen at the landscape and larger scales.

C. Risk

There is a high risk that significant acreage of this type will continue on the path of succession to other vegetation types. The Manti-LaSal National Forest estimates an average of 1600 acres of quaking aspen change to other vegetation types each year. The lack of successful regeneration over large areas increases this risk. Continuing heavy browsing pressure by ungulates on existing quaking aspen and other forage species on these sites will result in habitat degradation for all species found within this type.

SUBJECT AREA: Lodgepole Pine

A. Background

Lodgepole pine is typically an early seral tree species ranging over extensive areas of the Region. It is abundant in southcentral Idaho, southeastern Idaho, northwestern Wyoming, northern Utah and on the Bridgeport Ranger District of the Toiyabe National Forest. Lodgepole pine forests can be characterized as: generally heavily stocked, on cold sites, and in large patterns (200+ acres). Lodgepole pine readily regenerates naturally after a fire and is often found in pure stands. Lodgepole pine longevity ranges from 150 to 300 years. The type has a history of extensive management, mostly by clearcutting in areas adjacent to Yellowstone National Park and in northern Utah. The actual percentage of the type under intensive management is small. Lodgepole pine has a history of extensive mountain pine beetle epidemics at elevations generally below 9600 feet. Dwarf mistletoe is the most common disease in lodgepole pine, affecting about 45 percent of the type within the Region. This parasitic plant affects growth in older trees and causes significant deformation and loss of branches. It causes some mortality in all age classes. Most lodgepole pine forests in the Region are in the mature and old age classes, except for recently harvested and wildfire burned areas. The historical fire regime was one of lethal, stand-replacing fires with about 150 to 300 years between fires. Meadows and ponds in this type are valuable to frogs and toads, and early seral stages are used extensively by small mammals, mule deer, nighthawks, hummingbirds, flycatchers, bluebirds and warblers.

B. Assessment

Currently there is very little balance of structural stages in the lodgepole pine type in the Region. This imbalance will continue to promote the wide swings in amplitude in the historical ranges of structural stages. Mature lodgepole pine forests in the Region have been significantly affected by mountain pine beetle epidemics. Bark beetle outbreaks have resulted in extensive mortality. Most areas of mature lodgepole pine forests are currently highly susceptible to bark beetle attack. Such widespread mortality results in conditions favorable for stand replacing wildfires or succession to late seral vegetation. The extensive areas of lodgepole pine forests on the North Slope of the Uinta Mountains are an example of a high risk landscape. In some areas of the type previous clearcutting over extensive areas has resulted in a landscape highly fragmented when compared to the historical pattern. The buffer/leave strip strategies used previously have compromised historical ecological patterns for the type. Stand patterns under clearcutting have not replicated historical patterns which tended to be larger in extent and more irregular in shape.

C. Risk

The primary short-term risk is related to structural changes in the mature age class. This age class is susceptible to large scale mortality from mountain pine beetle infestations and wildfire. As dead lodgepole stems fall to the ground over a 10 to 20 year period; travel corridors are blocked for large ungulates such as deer, elk, moose, and domestic livestock and risk of catastrophic wildfire increases. Many of these areas burn twice with about 30 years between fires. Such repeat burns have more profound effects on soils, watershed and vegetation than single burns with longer intervals between events. Long-term risks are related to large swings from mature aged forests to grass/seedling classes. These risks result from the rapid change from late-seral to early-seral conditions thereby affecting late seral dependant wildlife species. Rate changes in time and space determine the amount of risk associated with a particular landscape. Current fragmentation within some areas will pose a risk to species that are dependant on the historical pattern of stand structures and habitat sizes and shapes.

SUBJECT AREA: Grand fir/ White fir Complex

A. Background

This ecosystem is found Region-wide except for eastern Idaho and northwestern Wyoming. Site conditions vary from very dry white fir sites in southern Utah to very moist grand fir types in Idaho. Moist sites in Idaho are among the most productive forest sites in the Region in terms of biomass. These true fir species regenerate readily in the shade of most other trees and grow well under very dense conditions. Consequently, within the Region, they are the potential climax tree species on most sites where they are found. Very dense multi-layered canopy conditions are common and provide excellent habitat and food for defoliators such as western spruce budworm and Douglas-fir tussock moth. More fire adapted seral species such as ponderosa pine, Douglas-fir, western larch, aspen, and lodgepole pine were common as a result of past fires throughout this complex. Non-lethal fires intervals of 10 to 60 years are within the historical range of disturbance to which the seral species are adapted. Current fire regimes are longer than 100 years and are more intense, resulting in stand replacing fires rather than the low intensity fires which favored the seral tree species. Wildlife inhabitants are typically animals of deep, dark, cool forests - red fox, fishers, wolverine, blue grouse, jays, woodpeckers and kinglets. Elk, mule deer, small mammals, hummingbirds and goshawk use early seral stages.

B. Assessment

The historical pattern was one where the true firs dominated relatively few stands. Most areas in the type were dominated by species favored and maintained by periodic, low intensity fires (e.g. ponderosa pine, Douglas-fir and western larch). Currently the typical stand structure and composition is multi-layered; comprised primarily of true firs and dominated by mature and overmature age/size classes. This is a result of a combination of fire exclusion, selective harvest of large seral species and natural succession processes. Insect outbreaks such as tussock moth and western spruce budworm have caused significant amounts of tree mortality over large forested landscapes. Fir engraver populations have reached outbreak proportions on the Toiyabe and Uinta National Forests. Lack of historically frequent, low intensity fire during last 100 years sets the stage for very intense, stand replacing fires. Grand fir and white fir are adapted climatically to some sites that were historically dominated by Douglas-fir and/or ponderosa pine because the true firs are very sensitive to even frequent low intensity fires and the seral species are favored by such fires. In the absence of low-intensity fires; grand fir and white fir increase in amount and density leading to eventual dominance by the true firs.

C. Risk

The risk in this ecosystem Regionally is high for stand-replacing wildfires with an associated loss of wildlife habitat for some species. Long-term watershed risks are lower than in some other systems, because these sites are more readily revegetated. Of greater concern is the slow but certain loss to advancing plant succession of early-seral tree species and associated grasses, forbs, and shrubs that sustain diverse wildlife habitats.

SUBJECT AREA: Interior Douglas-fir

A. Background

Douglas-fir is widespread throughout Utah, southern Idaho and northwestern Wyoming with lesser amounts in Nevada. Douglas-fir vegetation ranges from adjoining ponderosa pine or even sagebrush types at lower elevations to true firs and spruces at high elevations. Site conditions are warm and dry at lower elevations to cooler and more mesic at higher elevations. The species is adapted to a wide variation of site, climate, and soil conditions. Historical stand structures were primarily even-aged, single-canopy stands. Douglas-fir is associated with a variety of insects and diseases including: Douglas-fir beetle, Douglas-fir tussock moth and dwarf mistletoe. Fire regimes were usually non-lethal at frequencies of 10 to 25 years on dry sites, and 30 to 50 years on cooler/wetter sites. This ecosystem provides nesting and foraging sites for goshawks, spotted owls, elk and mule deer.

B. Assessment

Current structures are typified by mid- to mature age/size classes, with limited amounts of old growth trees. This small proportion of old growth is due to insect and disease epidemics and past harvest practices. Relatively few areas are in the seedling and sapling structural stage. Because Douglas-fir often grows on steep terrain; management activities may be limited. The Targhee N. F. has some of the more accessible sites within the Region. Forest succession in

the absence of fire has allowed growth of true firs into areas that historically were dominated by Douglas-fir in Idaho and Utah. At higher elevations in eastern Idaho and northwestern Wyoming, Douglas-fir stands are often dense and lack the true firs commonly found on warmer sites in Idaho and Utah. Fire regimes in the type now average 100 years between fires with increasing susceptibility to stand replacement fires. Ladder fuels exist where plant succession has led to dense regeneration of Douglas-fir and true firs under existing canopies. Douglas-fir beetle is currently at epidemic levels on some sites in south central Idaho and in central Utah; but remains at endemic levels throughout most of the rest of the Region. The largest Douglas-fir tussock moth outbreak within the Region occurred in 1992, when over 420,000 acres of defoliation was recorded. Sites with three or more consecutive years of defoliation experience significant amounts of mortality.

C. Risk

The most significant risk is associated with fire; particularly where ladder fuels exist or are developing. Stand replacement fires, outside of historical ranges of intensity and size, are likely. Insect populations are primarily at endemic levels within the type. Sites become more susceptible to Douglas-fir tussock moth defoliation, as stand densities and proportion of grand fir increase through time. Risk to Douglas-fir beetle increases as tree and stand densities increase. Disturbances caused by defoliation or windthrow and extended periods of drought also increase tree susceptibility to bark beetles in older, dense stands of Douglas-fir. Approximately one-third of the Douglas-fir type within the Region is affected by dwarf mistletoe. In some areas, levels of infection are moderate to high affecting viability of the trees. Potential loss or reduction of habitat conditions for late-seral dependant wildlife species is high. A post-fire increase in herbaceous vegetation may temporarily improve habitat for ungulates such as elk, deer and domestic livestock. The historical balance of patterns and structures will be compromised by large stand-replacing fires, or continued exclusion of frequent non-lethal fires. Such unbalanced patterns provide poor habitat for the suite of animal and plant species which historically inhabited this forest type. In addition to unplanned vegetation changes; more intense disturbances have significant negative effects on soil and water quality.

SUBJECT AREA: Ponderosa Pine/ Jeffrey Pine complex

A. Background

This ecosystem is found mainly in southern Idaho on the Boise, Payette, Sawtooth, Challis, and Salmon National Forests. Jeffrey pine in the Region is limited to the Sierra Mountains in western Nevada (Reno/Tahoe). Historical structures were predominately multi-canopy, lightly to moderately stocked, and dominated by ponderosa pine/Jeffrey pine. Current structural conditions are mainly mid- to mature-aged classes, with small amounts of old growth and seedling /sapling size classes. Historically, the fire regimes were typically non-lethal and at intervals of 5-25 years. Some of the best goshawk and flammulated owl habitat was in these savannah forests.

Past management in the 60's, 70's, and 80s' simplified many of the structural conditions resulting in a more even-aged single canopy structure. On the Boise NF extensive stands of pure ponderosa pine are common in areas planted after the wildfires of the last four decades. Past management focused on removal of large overmature trees further simplifying ecosystem structure.

In the Sierra Front, the "Comstock" mining era led to the removal of the majority of mid to older aged Jeffrey pine. These sites currently consist primarily of 80 to 100 year old even-age Jeffrey pine at densities beyond site potential for sustainability. California spotted owls utilize this habitat for foraging.

B. Assessment

Current structures are dominated by overstocked, mid- to mature-aged, and old size/age classes. Successional processes in the absence of frequent fires or other disturbances (i.e. timber harvest) has let to the ingrowth of more shade tolerant late seral species such as Douglas-fir and true firs on sites historically dominated by ponderosa /Jeffrey pine. Fuel ladders from layered vegetation add to the risk of catastrophic fires. The majority of the larger young plantations on the Boise N.F. are considered a high wildfire risk. Currently, insect populations are at endemic levels in southern Idaho. Regionally, dwarf mistletoe affects approximately one-fourth of the ponderosa pine type. Current fire regimes include larger more intense fires (50,000-300,000 acres), especially in the last ten years. The historical fire regime of smaller, less damaging fires, is not occurring in this cover type. The soils are primarily granitic which are highly erosive when disturbed. Previous roading and extensive burned areas are delivering significant amounts of sediment in waterways thereby degrading fish habitat in major streams and rivers.

Jeffrey pine beetle populations remain at epidemic levels on some sites on the Toiyabe N.F., resulting in significant mortality of Jeffrey pine within the affected areas. Jeffrey pine beetle populations have increased significantly on the California side of the Regional border, with the heavy populations found in the Lake Tahoe area affecting larger landscapes.

C. Risk

A high risk exists for losing significant acreages of the type to catastrophic wildfires similar to those during the last few years. This actual and potential loss decreases habitat for late-seral vegetation dependent wildlife species. A post-fire increase in herbaceous plants improves habitat for ungulates such as deer and domestic livestock. The historical balance of landscape patterns and vertical structures is compromised by large stand-replacing fires, or the continued exclusion of frequent non-lethal fires. Loss of ponderosa/Jeffrey pine to late seral species such as Douglas-fir and white fir results in a net loss of ponderosa/Jeffrey pine habitat. Such unbalanced patterns provide poor habitat for the suite of animal and plant species which have historically inhabited this ecosystem. This impact could be greatest on goshawk. In addition to unplanned vegetation changes; more intense disturbance events have significant negative effects on soil and water quality.

SUBJECT AREA: Ponderosa Pine (Southern Utah) type

A. Background

This ecosystem is found on the Ashley, Dixie, Manti-LaSal, and Fishlake National Forests within the Intermountain Region. Tree species composition and the complex of associated insects are

different from the ponderosa pine in southern Idaho. In southern Utah this type is found between Gambel oak/sagebrush at lower elevations and mixed conifers (Douglas- fir and white fir) at higher elevations. Structures are normally multilayered with a range of tree sizes. The climate is warm and dry with annual precipitation of 16 to 24 inches. Historical fire regimes include non-lethal fires at intervals of 5 to 25 years. Some of the best goshawk, flammulated owl and wild turkey habitat in the Region occurred in these savanna forests. Mexican spotted owl utilizes this habitat for foraging.

B. Assessment

Exclusion of frequent non-lethal fires has allowed much of this cover type to progress to latter successional stages. Structures are predominantly made up of larger trees in the mid- to mature-aged classes, and are overly dense. Composition in some areas now includes a much higher proportion of late seral tree species such as Douglas-fir, or white fir. Early seral species such as aspen are poorly represented. The effects of harvesting in the 60's and 70's, which created open stand conditions are now declining, particularly in the Monticello unit of the Manti-LaSal National Forest.

Overly dense stands create conditions leading to a major mountain pine beetle epidemic. Tree mortality has increased over the last six years resulting in pockets of mortality at times exceeding 500 trees. This epidemic is expected to increase in size and intensity. Regionally, dwarf mistletoe affects approximately one-fourth of the ponderosa pine type.

Fires have not been active in these areas for the last 100 years, adding to the density and ingrowth of late-seral tree species (e.g. Douglas-fir and white fir). Ladder fuels are well developed and contribute to wildfires outside of the historical range in intensity and size. In addition to ladder fuels, there is a build up of forest litter increasing potential fire hazard and lethal effects of fires on vegetation by concentrating heat on the upper soil layers and around the stems of trees and shrubs.

C. Risk

The risk is high in this cover type for losing significant acreages to catastrophic wildfires similar to recent fire activity on the Dixie and Manti-LaSal National Forests. This actual and potential loss will cause a reduction in habitat conditions suitable for late-seral dependent wildlife species. A post-fire increase in grass/forbs may improve habitat for ungulates such as deer and domestic livestock. The historical balance of patterns and structures within the ecosystem may be compromised by large stand-replacing fires, and/or the continued exclusion of low intensity fires (which favor ponderosa pine regeneration and dominance). Replacement of ponderosa pine by more competitive late seral species such as Douglas-fir and white fir results in a net loss of ponderosa pine forest. Such vegetation patterns outside the historical range of conditions provide poorer habitat for the suite of animal and plant species which historically inhabited such ponderosa pine forests. This impact could be greatest on goshawk and Mexican spotted owl.

SUBJECT AREA: Pinyon-Juniper

A. Background

Pinyon pine is generally more abundant in stands at moderate elevations; while at lower elevations, juniper dominates most sites. There are three juniper species in the Region: Western juniper, Utah juniper, and Rocky Mountain juniper. Western juniper is found in northern Nevada and western Idaho, accounting for a small percentage of the juniper type in the Intermountain Region. Utah and Rocky Mountain junipers are widespread throughout the Region.

Utah juniper grows on relatively dry sites with an annual precipitation of 10-15 inches. It does not sprout after fire. Its distribution and density has increased at lower elevations due to grazing and lack of fire, allowing it to occupy areas with deeper soils. As it increases on these sites; it displaces sagebrush and mountain brush cover types. Utah Juniper is a surface feeder with a shallow, spreading root system making it highly competitive with other plants. Pinyon pine becomes more abundant on sites where annual precipitation exceeds 18 inches. This habitat is very important to many wildlife species such as some salamanders, lizards, small snakes, mule deer, spotted owls, swallows, ravens, bluebirds, kinglets, and insectivorous warblers.

Rocky Mountain juniper is found on somewhat more moist sites than Utah juniper with 18-20 inches of annual precipitation. Its range has not expanded as extensively as Utah juniper. This juniper is characterized by a heavy seed, high water use, and limited value to ungulates for browse. Expansion of its range to lower elevations is limited by drought; expansion into more mesic sites is limited by competition with more competitive coniferous forest species.

B. Assessment

Utah juniper currently exceeds its historical range by as much as 60 percent. Fire return intervals have increased compared to historical patterns. Erosion rates are accelerated because there is little understory vegetation to help retain the soil in the overmature stands of juniper. Balance of structural stages is strongly weighted to mature and overmature stands. This stand structure is not considered a properly functioning condition.

Rocky Mountain juniper is typically found between conifer forest and sagebrush vegetation types and has not significantly increased in area but has increased in density. The grass/forb component in overmature and dense stands of juniper is significantly reduced. Watershed conditions are deteriorating due to the lack of soil cover and as a result of competition for available moisture by an increase in juniper plants. Loss of native grass and forb cover decreases the acreages of wildfires due to lack of fine fuels necessary to carry fire. The number of fire starts are approximately the same as in historical times but the extent of the fires is much reduced. These historical fires regulated the distribution of pinyon-juniper and the overstory/understory ratios.

The majority of insect and disease activity is endemic, although on some sites abundant activity can be observed. Dwarf and true mistletoe are widespread throughout the pinyon-juniper cover type. Pockets of black stain and Pinyon ips bark beetle vary throughout the range of pinyon-juniper with some areas having abundant black stain and Pinyon ips bark beetle activity.

C. Risk

The risk associated with this cover type is high because of accelerated erosion caused by reduced herbaceous ground cover. The area affected is significant throughout the Region.

Unbalanced structure, composition, and pattern are indicators of improperly functioning conditions, and diminishing value as wildlife habitat.

SUBJECT AREA: Mountain Mahogany

A. Background

There are two major mountain mahogany species found within the Region, curl-leaf mountain mahogany and birch leaf mountain mahogany. To evaluate risk and develop management strategies, resource specialists must understand the differences between these species. Both species are highly desired forage by wildlife and livestock. The south or west slopes common in the type and the nutritious forage provided by the mountain mahoganies make these sites highly important winter ranges for wildlife.

Birch leaf mountain mahogany is deciduous and sprouts following fires. It is typically found on calcareous parent materials. It is very resilient to use and disturbance events and it tolerates extended periods of drought.

Curl-leaf mountain mahogany is evergreen, has a tree like form, and has a number of disease pathogens. It is also often found on calcareous substrates but may grow on other substrates as well. Because it does not resprout after burning and reproduces by only seed; it has been difficult to regenerate. Wildfires have killed some areas of curl-leaf mountain mahogany resulting in sites that are difficult to regenerate. Many stands of curl- leaf mountain mahogany have been heavily browsed resulting in a "highlined" condition. Birch leaf mountain mahogany has also declined in cover as a result of heavy browsing pressure by domestic and wild ungulates with concomitant increase in bare soil. Use by large ungulates such as elk, deer, bighorn sheep and moose is high.

B. Assessment

Curl-leaf mountain mahogany has been heavily browsed throughout the Region as evidenced by the "highlined" condition. This species is primarily in an old structural condition and not successfully regenerating. The heaviest losses of this component are on dry southern slopes and at lower-moderate elevations where the type is found. Livestock, ungulate wildlife and small mammals are adversely affecting this species ability to regenerate. Its large seed is a preferred food of rodents, further impacting regeneration. Overgrazing by ungulates is reducing ground cover and degrading general watershed conditions.

Birch leaf mahogany has an advantage regenerating, since it resprouts after fire or browsing. However, this species continues to decline due to excessive ungulate use. Vegetative cover on south slopes has been reduced by an estimated one-third in some areas during the last 30 years. On these sites, higher amounts of bare soil are now present. Although this species remains in good condition on north facing slopes, the continued loss of this species on south aspects will eventually lead to a decline on north aspects as ungulates search for available food sources.

C. Risk

The risk remains high for a continued decline of both mountain mahogany species. Importance as a valuable forage for native wildlife increases their value. Most populations are decadent and regeneration is not keeping up with mortality. Old age and inadequate reproduction of existing plants constitute a risk of losing the type altogether in some places. Bare ground increases as vegetation is lost, and watershed values are adversely affected. The most severe loss of birch leaf mountain mahogany is occurring on southerly aspects of its range. Continued heavy use by ungulates will prevent regeneration, causing significant loss of soil and watershed values.

SUBJECT AREA: Gambel Oak

A. Background

Distribution of oak is primarily limited to foothills in eastern and southern Utah. This prolific sprouter occurs in extensive stands throughout its range. On better sites, oak exists in tree form. Today the range of Gambel oak is estimated to be greater than it was historically. Gambel oak provides good watershed protection because it holds the soil in place by its massive root system. It also supports abundant understory grass and forb cover unless it becomes so dense that species are shaded out. "Scrubby" Gambel oak is valuable habitat for some salamanders and lizards, small snakes, mule deer, Swainson's hawk, owls, swallows, ravens, warblers and finches. With pines in parts of southern Utah, Gambel oak is a component of Mexican spotted owl habitat.

B. Assessment

The Gambel oak type is in moderate to excellent condition throughout its range. Fire intervals may be slightly longer than historical averages, but Gambel oak stand structures and conditions are sustained and viable. Some habitat has been lost to residential encroachment in the foothill areas. A variety of insects are commonly associated with the oak type; however, none of the native insect species pose a threat to the oak resource. Most detrimental effects are temporary and are the result of fire or weather (frost). Since it is a prolific sprouter; recovery of oak communities is often rapid. Existing watershed conditions and recycling of nutrients within oak sites is favorable and its value to wildlife seems undiminished. Additional study of the oak component is necessary to fully understand the interactions occurring within this type.

C. Risk

The majority of this vegetative type is not presently at risk within the Region, except for areas where residential incroachment is occurring. One primary concern is the fire hazard this type may present to humans within urban interface areas.

SUBJECT AREA: Tall Forb

A. Background

This cover type is considered the "flower garden" of the mountains. Historically, tall forb types were common throughout the mountains of Utah, western Colorado, western Wyoming,

southern Montana, and southeastern Idaho at elevations above 7,000 feet, and in precipitation zones where annual precipitation is greater than 35 inches. These sites are characterized as having a wide variation of deep, well-drained productive soils. Forbs are the dominant vegetation. Tall forb mountain meadows are valuable to elk, eagles, owls, humming birds, swallows and many small mammals.

B. Assessment

Approximately 50 percent of this type was lost years ago due to improper grazing; which caused a significant loss of the deep, rich soils. Many sites are presently dominated by tarweed and mountain coneflower. Site restoration is very difficult, or nearly impossible, because most of the loamy soils are gone. At best, it will require a long time interval or expensive efforts to restore these sites to their historical condition.

C. Risk

The remaining 50 percent of the tall forb community is at extreme risk if current grazing practices continue to degrade its composition and structure. Loss of these sites to conifer encroachment is also possible. Because flower production is adversely affected when these tall forbs are lost, some sensitive, disjunct or isolated colonies of butterflies are also at risk of disappearing. Protecting this easily lost cover type is important because less than half of the original acreage is still in a properly functioning condition, and rehabilitation is often impractical.

SUBJECT AREA: Mountain Brush Complex

A. Background

The mountain brush community is a complex of several different species but they share some common chacteristics. The complex has slightly higher moisture regimes than does sagebrush, with an annual precipitation of 15 to 20 inches. Common shrub species include: chokecherry, bittercherry, service berry, mountain snowberry, mountain maple, and elderberry. Each of these species resprout after fires. This cover type is found intermingled with sagebrush at mid elevations and conifer/aspen forests at higher elevations.

B. Assessment

The range of mountain brush has been shrinking, due to longer fire intervals and overgrazing by ungulates. Wherever this vegetative type is found on south facing slopes and is used as winter range; its extent and condition continues to decline. On north slopes, the type is generally in good condition. Mountain maple has been an exception, increasing in some areas of the Wasatch, Caribou and Targhee National Forests and especially in northern Utah. Many mountain maple areas are so dense, herbaceous cover is reduced.

C. **Risk**

This cover type is not large throughout the Region; however, locally its significance can be great. Loss of berry production, reduced grass cover, and an increase in diseases will

adversely effect its potential value to a wide variety of wildlife and livestock. Wherever mountain brush declines, protection of soil resources is also reduced.

SUBJECT AREA: Big Sagebrush/Grasslands

A. Background

There are two major subspecies of big sagebrush in the Region: Wyoming big sagebrush and mountain big sagebrush. Wyoming big sagebrush occurs on a relatively small proportion of National Forest lands. This species is found in precipitation zones averaging 8-11 inches per year in the Intermountain West. Wyoming big sagebrush is commonly found in the Lemhi Mountain Range on the Salmon/Challis and Targhee National Forests, and in the Curlew National Grasslands on the Caribou NF. Historically, lethal wildfires occurred at approximately 40 year intervals. Sagebrush successfully reseeds after fire unless fire intervals are short enough to interrupt seed production.

Mountain big sagebrush is the most common species throughout the Region. Annual precipitation in this type is 12-15 inches with a fire frequency of 20 years. Fire is normally lethal to plants but rapid regeneration occurs as a result of natural seeding. Vegetation patterns are usually patchy with several age classes represented within any one geographical setting.

B. Assessment

Most big sagebrush stands are currently outside a balanced range of structural classes. Most of the type presently occurs as mature plants in sites with more than 15 percent sagebrush cover and greater than 20 percent bare mineral soil exposed. These types and conditions have significantly increased within the Region in the last 100 years, due to grazing practices and fire exclusion. The grass and forb understory on these sites is diminishing because of grazing in combination with the increase in overstory sagebrush (>15 percent). As a result of this loss in understory vegetation, soil stability and productivity may also be seriously affected. Overland flow as a result of rain, is causing surface soil erosion and deposition in other cover types, i.e. riparian areas. Additionally, transpirational losses are occurring due to the dense sagebrush canopies. This reduces underground recharge of soil water in adjacent types, especially riparian areas.

C. Risks

The risk of soil loss and subsequent damage to sites is high across the range of mountain big sagebrush. Significant habitat loss for several avian species exists under current conditions. In the last 30 years, breeding bird counts for Brewer's Sparrow have declined at an annual rate of 6.3 percent; horned lark has decreased by 4.8 percent annually; and grasshopper sparrow counts in this habitat have declined by 18 percent per year. This habitat is experiencing the second most critical habitat loss for songbirds identified by wildlife specialists; after the critical habitat loss in riparian sites. Currently the majority of the big sagebrush complex is not in a properly functioning condition.

SUBJECT AREA: Riparian and Wetlands

A. Background

Riparian sites characteristically occupy a small amount of National Forest System land base; but they are highly productive and heavily utilized by people and animals. Populations of newts, salamanders, frogs, toads, turtles, small snakes, shrews, bats, beaver, weasels, otter, wood duck, Cooper's hawk, small owls, flycatchers, swallows, dipper, wrens, thrushes, warblers, orioles and sparrows use this restricted habitat.

Some riparian cover types have disappeared because of overuse and abuse by humans and animals. Water diversion, roads, timber harvest, grazing, and trampling have been major causes of negative impacts on riparian ecosystems. Riparian areas are indicators of watershed conditions.

B. Assessment

Riparian areas throughout the Region have been significantly affected over the past several decades. Most of these effects have been negative, including: lowering of water tables, erosion of stream channels, exotic plant encroachment (e.g. tamarisk), removal of beaver populations, concentrated runoff and increased sediment from road construction, and changes in vegetation composition. All have contributed to degradation of riparian areas.

Riparian problems begin at higher elevations on steeper slopes, and gradually increase with decreasing elevation and slope. Some riparian zones suffer from loss of soil-holding vegetation; restoring native riparian vegetation would provide shade, cover, and soil protection, which would improve water quality and wildlife habitat. Other sites have too much vegetation -- interruption of historic disturbance patterns and several decades of reduced flows have led to cottonwood recruitment and many overmature Populus species on some sites. These stream courses have experienced reduced flows, or have even quit flowing. Populations of several species of frogs, bats, and birds (sandhill crane, yellow warbler, Brewer's blackbird, killdeer, northern rough-winged swallow, Wilson's phalarope, and common yellowthroat) are declining significantly, in part due to diminishing riparian habitat.

C. Risk

Risk increases annually, due to a variety of impacts within riparian sites:
degradation of water quality, soil stability, and wildlife habitat, and increasing human disturbances. This is the **most** important ecosystem component in the Region that is currently outside properly functioning condition.

REGIONAL SUMMARY OF PROPERLY FUNCTIONING CONDITION

After the team completed the assessment by subject areas they were ranked to reflect the relative risk to PFC at a Regional Scale. The relative risk rating of low, moderate and high is an indication of how much departure there may be below the properly functioning condition. These rankings only apply to biological and physical attributes and do not reflect management priorities when social expectations are factored in.

High Risk

Riparian/Wetland
Quaking Aspen
Big sagebrush/Grassland
Pinyon-Juniper
Tall Forb
Engelmann spruce-subalpine fir
Grand fir/white fir

Moderate Risk

Ponderosa pine/Jeffrey pine
Ponderosa pine Southern Utah Type
Douglas-fir
Lodgepole pine
Mountain mahogany
Subalpine timberline forests and woodlands

Low Risk

Mountain brush
Gambel oak
Alpine