3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1. Introduction

This chapter includes both the affected environment and environmental consequences sections for all resource topics covered by this environmental assessment. The affected environment is a brief description of the existing environment that could be affected by the proposed action.

The environmental consequences section analyzes the effects, both beneficial and adverse, that would result from implementation of the various alternatives. It is the scientific and analytical basis for the comparison of the alternatives and presents the impacts of implementing the alternatives in terms of environmental changes.

3.2. Past, Present, and Reasonably Foreseeable Future Actions

In addition to effects from the action and no action alternatives, cumulative impacts are assessed as required by the Council of Environmental Quality (CEQ). Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Consultation with neighboring agencies and governments was used in considering past actions by USFS and others to determine potential cumulative impacts. Ongoing and future actions may contribute to effects to resources that would also be affected by the proposed project. The need to include these activities in the cumulative effects section of each individual resource analysis depends on the extend of the cumulative effects analysis area and the duration of effects on each resource. Future activities described in this section are not part of the decision to be made for this EA. Ongoing activities in and near the project area are similar to past activities.

Fuels Treatment

Fires will continue to occur on forest lands from both natural and human-induced causes, and prescribed fire operations will continue to be applied in the future. With the increased emphasis on fuel treatment on federal lands and increases in residential use on nearby private lands, mechanical and prescribed fire fuel treatments will continue to occur.

Grazing

Livestock grazing allotments on federal lands within the project area will likely continue. There are a portion of three grazing allotments within the Herring Park analysis area: Aspen Ridge, Bassam and Cameron

Recreation

Maintenance of existing Forest roads and trails will continue throughout the area.

Residential Use
Development will continue to occur on private land in the area. Concurrent with this development will be the likely increase in traffic on roads in the project vicinity.

Beetle Infestation
Widespread occurrences of MPB are causing damage in lodgepole and ponderosa pine stands throughout the forest.

Timber Harvest
Large and small timber sales have occurred and will continue to occur. Fuelwood sales for the public are likely to continue.

3.3. Forest Vegetation

Affected Environment
Forests are dynamic systems that change through time in response to both small and large-scale events. Over the past 100 years or more, many of the region's forests, including those of the analysis area, have been significantly altered through a variety of natural and human influences.

Ponderosa pine occupies the majority of the project area; it is most common in the southern and easterly areas. The northwest and upper elevation west area is dominated by Douglas-fir. Blue spruce is common in the northeast and eastern lower elevation areas. Limber pine is present throughout the area. Minor amounts of lodgepole pine are present. Aspen is common in both dry land and riparian environments.

Ponderosa pine has been increasingly infested with mountain pine beetle for about 4 years. The chief area of mortality has been the southwest and central west areas. The southeast and east areas have both ponderosa pine that has not been infested with mountain pine beetle and areas that are currently infested. Ponderosa pine regeneration of seedlings and saplings is common throughout the project area including those areas that have been severely impacted with mountain pine beetle. Several small areas of dwarf mistletoe exist in the ponderosa pine.

Aspen is in decline over much of the project area. It is being encroached upon by conifers, has been weakened by extended drought and is under attack by pathogens and insects. The large scale drought related aspen mortality currently being experienced in other parts of Colorado have not been seen in Herring Park yet; overstory aspen mortality has been seen about a 12 miles to the north in the Ranch of the Rockies Hazardous Fuel Reduction Project. There is a shortage of large diameter aspen. Large diameter aspen exist primarily in riparian areas and usually as larger trees amidst much smaller aspen.

Douglas-fir began to be infested with spruce budworm about 20 years ago. The earliest information regarding spruce budworm infestation is about 1986 in the southeast part of the project area. An area of major Douglas-fir mortality due to spruce budworm in the northwest part of the project area was considered healthy in 1985; surveys do not mention spruce budworm.

This same area, northwest part of project area has about 95% mortality with Douglas-fir seedlings becoming established.

About 500 acres of high mortality exist in the western part of the project area; some of this is on slopes greater than 35%, which is considered the upper limit for ground based yarding. Approximately 80% of these dead Douglas-firs are still standing and considered sound for product removal.

A suite of understory plants including common juniper, kinnikinnick, woods rose, ribes, snowberry, cinquefoil, pussytoes, Richardson's geranium, and native grasses occur throughout the area. Grasses are especially abundant in areas experiencing mountain pine beetle mortality.

Environmental Consequences

No Action Alternative

This alternative would defer any vegetation treatment at this time and not achieve the Purpose and Need described in Chapter 1. Stands would continue to develop and would be highly susceptible to disturbance events. Forest health and vigor would be expected to decline because of continued Mountain Pine Beetle (MPB), Dwarf Mistletoe (DM), Spruce Budworm (SBW) mortality and fire exclusion. Vegetative growth and increased surface fuel loading from MPB and SBW mortality would increase ignition potential and wildfire intensity. In the absence of fire, stand species composition would shift toward less fire adapted, shade-tolerant species like Douglas-fir. In the presence of fire and with continued MPB mortality, stands would shift toward earlier seral stages of development. Aspen will be continued to be encroached by conifers and will experience decline mortality due to pathogens and insects. Ongoing or previously approved management activities would continue.

Cumulative effects include increased fire hazard as a function of continued stand growth, mortality, and surface fuel loading. If a high intensity fire were to occur, many resources would be adversely impacted, including timber, wildlife habitat (of some, not all species), watershed health, private development opportunities, recreation, and aesthetics.

Proposed Action Alternative

Treatments are targeted toward MPB infected stands and are intended to minimize epidemic levels of insects and disease, reduce threats from high intensity fire, and maintain a sustainable recruitment of fire adapted species to provide a high forest canopy cover. Treatments are intended to prepare stands for the safe reintroduction of fire within and across stands, and employ approaches that attempt to approximate stand development within a fire climax reflective of forest reference conditions. Mechanical treatments would represent the intermediate silvicultural cutting system of thinning. Most thinning would employ the "thin from below" method that removes trees from the lower crown classes (overtopped, intermediate, and some co-dominant). In some cases small patch cuts would be utilized to salvage dead or dying timber, and/or a "free thinning" method would be blended with "thin from below" to release desirable trees regardless of their crown position. This latter method would be used primarily in Ponderosa Mixed Conifer stands to encourage minor species (e.g. ponderosa pine, aspen) or species free from disease to persist and develop.

Slash treatments would be as described in Chapter 2. Overall treatment goals would consider various wildlife habitat requirements as well as operational considerations that would prohibit full stocking reduction to the ideal level.

Relative to the treatment intensity, the proposed action would meet a number of important objectives indirectly or cumulatively overtime:

- Stand density and ladder fuels would be reduced across the stand;
- surface fuel loading would be reduced and prescribed underburns could be safely conducted within treated stands as well as across stands;
- stand seral stage would be accelerated toward late and old forest
- conditions;
- stand health and vigor would be improved and thus slow epidemic levels of insects and disease;
- stand resiliency would be increased as natural processes (fire, nutrient cycling, disease) begin to operate within more normal ranges of variation;
- wildfire hazard would be reduced;
- fire safety to firefighters and homeowners would be improved; and
- fire suppression costs would go down.

3.4. Fire And Fuels

Affected Environment

Wildfire has long been a primary disturbance agent in the Herring Park area. Studies northeast of the analysis area by Forest Service researchers Peter Brown and Wendell Hann found a pre-settlement fire return interval of 10-12 years in lower elevation ponderosa pine sites (USDA-FS 2003). These fires were low intensity ground fires that helped to "clean up" the forest by reducing understory shrubs, shade-tolerant trees, and dead fuel accumulations. This data is not from the analysis area but still useful because of its proximity and similar management history.

Pre-settlement fire ecology of the area began to change in the 1880's as greater numbers of Hispanic and Euro-American settlers began to populate the area. These newcomers viewed fire as a threat to human lives, property, and resources, and they began to vigorously suppress all fire, thus changing the fire ecology of the area. This disruption of the historic fire pattern, coupled with the wettest 200-year period in the last millennium (RMRS 2002a) has resulted in a steady accumulation of fuel and some correspondingly significant ecological changes.

In addition to generally greater number of trees present today, we also see greater forest homogeneity and greater fuel continuities than in the past. Specifically, the Herring Park project area has increased surface fuel loads, increased ladder fuels (fuels feeding fire from the ground upward), and denser stands of small diameter, non-fire adapted tree species (as compared to longer lived fire adapted species such as ponderosa pine). The result is decreased diversity, altered energy flow and nutrient cycling processes, and a much greater potential for resource-damaging disturbance events such as the current MPB epidemic and large-scale fire.

Environmental Consequences

No Action Alternative

This alternative would do nothing to change current conditions. It would not meet the intent of current management and is in direct conflict with forest-wide efforts to reduce fire hazard. It would result in increased fire hazard and decreased firefighter safety as vegetation becomes denser, trees and shrubs continue to decline in vigor, mortality from insects and disease continue, and standing dead and down fuels accumulate. Continued fire exclusion coupled with the current MPB/SBW epidemic and drought conditions would increase surface fuel loads significantly. Continued regeneration of shade tolerant, non-fire adapted species like Douglas-fir would promote ladder fuels with continuous vertical fuel arrangement, thus increasing active fire potential.

Without fire and other proposed treatments, encroachment of conifers and other woody species would continue into openings, thus reducing any potential they might offer as natural firebreaks and control features or safety zones for firefighters.

This alternative provides little incentive for cooperative fire safety programs with private landowners as elimination or deferment of proposed treatments can discourage landowners from fire safety practices on their own properties.

The no action alternative may contribute to existing adverse cumulative effects on forest health by increasing the probability of catastrophic wildfire losses. The MPB epidemic and generally deteriorating stand conditions will increase forest-wide safety hazards (down trees, falling trees).

Proposed Action Alternative

The proposed action will result in beneficial direct, indirect, and cumulative effects on fuel conditions and fire behavior. Implementation of the proposed action would have the greatest impact in decreasing the risk of large, high intensity fires, and changing stand conditions to one of greater health and resiliency.

Implementation of the proposed action will meet the desired conditions for fuel and fire behavior and allow for efficient and safe suppression of most wildland fire ignitions. Prescribed fire treatments would be conducted under a tight window of appropriate weather constraints and would require a burn plan. Wildfires could also be controlled through initial attack in all but the most severe weather conditions. Firefighter safety would be enhanced and the cost of suppressing future fires could be lowered.

3.5. Hydrology and Soils

Affected Environment

There are no perennial streams in the project area. Table 1 lists the six sixth-level watersheds within the Project Area and their watershed health rating.

Watershed	Watershed Name	IWWI Rating
11020001090100	Badger Headwaters	2
11020001090200	Sawmill Gulch	2
11020001090500	Herring Creek	2
11020001090300	Badger Creek Composite	3
11020001090600	Long Gulch	2
11020001090700	Rye Slough C	2

Inland West Watershed Initiative (IWWI) Watershed Quality

In 1997 and 1999 the Pike and San Isabel National Forests, Cimarron and Comanche National Grasslands (PSICC) classified watershed conditions in the Inland West Watershed Initiative (IWWI). Watershed conditions classes (WCC_1, WCC_2, WCC_3) range from healthy to degraded. The Badger Creek Composite watershed is identified in the Inland West Watershed Initiative (IWWI) as being a Class 3, degraded for sediment. Sources for sediment include erosion from unvegetated areas such as roads, trails, and bank erosion.

Hydrologic processes that may be affected interception, surface runoff, erosion, infiltration and soil water storage. These processes are linked to each other.

The process of vegetation interrupting the fall of precipitation onto the soil surface is of importance as it reduces raindrop impact at the soil surface and, consequently, detachment of soil particles (Baker 1990). Under the right conditions, detached soil particles can move off site into streams and increase their sediment loads. Sediment delivery efficiency ratings consider properties of landtypes of soil map units that affect sediment delivery. Slope steepness and drainage channel density are important measurable properties used to make these ratings. Map units rated low have average landform slopes of less than 40 percent and may have grassland or forest vegetation. Drainage density is low with spacing of channels usually greater than 1800 feet. Soil erosion on most of these units is far enough from stream channels that transported soil is stabilized before it becomes sediment (Irvine et al. 1995).

Some important variables found to affect infiltration under simulated high-intensity rainfall rates (91-127 mm/hr.) include: percentage of ground cover, vegetation cover type, soil texture and porosity, and amount of soil organic material (Dortignac and Love 1961, Meeuwig 1965). Soil mantle water storage is usually recharged to capapcity or near capacity during the springtime.

Many of the factors affecting infiltration are adversely affected by fire, resulting in reduced infiltration and increased overland flow (Hendricks and Johnson 1944). Intense fires can reduce surface resistance to erosional processes by removing the protective soil surface cover and exposing the soil surface to raindrop impact. The immediate impact of burning on soil nutrients is conversion of much of the organically bound nutrients in the forest floor, woody debris, and herbaceous vegetation into their inorganic forms.

Whether these inorganic nutrients remain on site as solids or are lost through volatilization depends on the temperatures reached during the burning and the differential volatilization temperatures of the nutrients (Wells et al. 1979). Soil organic matter, important for maintaining soil aggregate stability and soil structure, which affect infiltration and water repellency, is completely destroyed at 450 degrees centigrade (Hosking 1938). The greatest loss of volatile nutrients and the greatest ash deposits from the less volatile nutrients occur where fuels are highest, such as in old growth patches or in piled slash (Covington and Sackett 1984, 1986).

Prescribed burns, by design, do not completely consume extensive areas of organic matter. Therefore, the mosaic pattern produced by restricting the aerial extent and degree of water repellency and resulting removal of surface cover often reduces the amount of soil movement within and from the watershed (Baker 1990).

Raindrop impact on bare soil directly detaches and moves soil particles over short distances. By dispersing soil fines, splash tends to seal the soil surface reducing infiltration and promoting overland flow (Baker 1990). Intense fires can reduce surface resistance to erosional processes so that critical threshold conditions for soil mobilization and transport are more readily attained. Accelerated erosion appears to result primarily from partial or complete removal of the protective cover (forest floor), leaving the soil surface exposed to the unrestrained erosive forces of raindrop splash and overland flow (Baker 1990). Large areas cleared by fires are vulnerable to erosion and can yield substantial amounts of eroded material especially if subjected to large, high-intensity summer storms immediately after exposure (Baker 1990). Accelerated erosion of surface soils has a negative effect on soil productivity because they contain mineral nutrients and organic matter.

Vegetation removal by fire decreases evapotranspiration, leaving more water in the soil at the end of the growing season than would have occurred if vegetation had been undisturbed. Wildfire can consume substantial amounts of vegetation, lowering evapotranspiration, and can reduce loss of soil water on a watershed. Minimum soil water content in the fall is often increased compared with prefire conditions. Because of reduced soil water storage capacity, subsequent precipitation is more likely to generate runoff here than on an undisturbed area (Baker 1990).

The mosaic pattern of prescribed burns restricts the aerial extent of the removal of surface soil protecting vegetation and organic matter often reducing the amount of soil movement within and from the watershed (Baker 1990). Properly executed prescribed burns, because of their mosaic pattern, will not significantly affect, either spatially or temporally, the integrated surface flow, infiltration, and streamflow regime of the watershed (Baker 1990). Prescribed burn normally does not greatly affect evapotranspiration and, consequently, little change in soil water storage is expected (Baker 1990).

The proposed project area is within the Northern Arkansas Granitics-39 Mile Mountain ecoregion (McNab *et al*. 2005). Soils are derived from colluviums and residuum (Moore 1992). Soil productivity in terms of erosion, compaction, and the effects of fire on soil nutrients are the factors considered in alternative evaluation.

Compaction of surface and subsoils can occur when equipment with high ground pressures like rubber-tired skidders is used on soils with high moisture contents. Compaction can have a variety of effects on soil productivity resulting from changes in both physical and chemical properties.

Reduction in pore space resulting from soil compaction can constrain the size and extent of root systems, reduce infiltration rates and alter the flow of air and gases through the soil all of which can limit the ability of roots to absorb water, nutrients, and oxygen.

Environmental Consequences

No Action Alternative

The no action alternative would have no immediate effects on the water resources of the analysis area, but it could have a fairly major, indirect, long-term effect on analysis area hydrology in the future. With no action, the potential for large stand-replacing wildfires would remain. These stand-replacing wildfires would provide the conditions for accelerated soil erosion because there would be little vegetation to intercept precipitation. Soil particles would become detached by raindrop impact for transport in surface runoff.

Surface runoff would likely be much greater following a stand-replacing wildfire and the subsequent creation of hydrophobic (water-repellant) soil conditions. An increase in surface runoff would be expected because of a reduction in soil water storage capacity due to the reduced evapotranspiration capacity.

There would be no treatments and accompanying ground disturbance with this alternative. The no action alternative is expected to have no short-term effects on soil erosion, but could have major, negative, indirect, long-term effects. With no action, the potential for large stand-replacing wildfires would remain. These stand-replacing wildfires would clear large areas providing the conditions for accelerated soil erosion.

The no action alternative would have no short-term effects on soil productivity, but could have major, negative, indirect, long-term effects. Implementing the no action Alternative would, in the short-term, keep soil productivity levels as they are now. Compaction would not be a factor because no equipment would be used.

In the long term, the existing high fire hazard could result in stand-replacing wildfires that would burn hot and substantially reduce soil productivity. Soil productivity would be reduced because most of the surface soil microorganisms would be killed, the soils would develop water repellency that limits infiltration of water, and many of the nutrients released as ash by the burns could be eroded from the site (Covington and Sackett 1990).

Cumulative effects associated with the no action Alternative include a contribution to the general decline in forest health, maintenance and increased susceptibility to stand-replacing wildfires that could be expected to involve treated stands because of the extreme intensity of those wildfires. Expected cumulative effects of taking no action are increased sedimentation to area stream channels resulting from increased soil erosion and transport by overland flow.

Proposed Action Alternative

Implementation of the proposed action could have minor, negative, indirect, short-term effects on analysis area hydrology, but conditions would likely be restored and maintained over the long term. This alternative would be implemented with specific criteria from the Watershed Conservation Practices Handbook Standards and PSICC Forest Plan.

The proposed action is expected to substantially reduce the potential for large stand-replacing wildfires in the analysis area. Harvest of dead and dying trees would open the canopy and increase the potential for the impact of rain on surface soils. Broadcast burns would also contribute to detachment of soil particles.

Surface runoff would likely be much less because of the mosaic nature of the harvest patterns and broadcast burns. Creation of hydrophobic (water-repellant) soil conditions is not expected because of the relatively cool fires of broadcast burns. Accelerated surface soil erosion would be minor, local, and surrounding vegetation is expected to trap eroded soil before it enters analysis area stream channels.

A total of 15 miles of temporary roads are proposed that would be used to access treatment areas. Some of these roads already exist as two-tracks and could be utilized. These roads would be constructed to the minimum standard needed for safe and efficient use by project equipment which will likely include some level of vegetation clearing and minor earth movement. The temporary roads would be closed and obliterated once the project is complete.

Implementation of the proposed action could have minor, negative, indirect, short-term effects on erosion and soil compaction, but it would likely increase soil productivity over the long term. Additional soil erosion is expected to be short-term and minimal because of the mitigation and management requirements included in alternative design and implementation. The soils would be able to absorb water because the mosaic burns would be accomplished by maintaining a perimeter of unburned vegetation around the burn to trap any eroded surface soil and keep it on site. The exception would be in areas where slash is concentrated in piles and burned. Soil damage would be expected because of the hot fires, but the extent is limited to acceptable levels as specified in the soils management requirements.

Minimal soil compaction would also be expected because of the inclusion of the design criteria and management requirements. Long-term increases are expected to occur primarily because stocking levels would be reduced from the present condition, and existing downed material, grasses and forbs, shrubs, and the residual from harvest would be burned in a controlled manner that would maintain most of the surface soil microorganisms. Fire temperatures would be cool enough to minimize water repellence, and nutrients would be more readily absorbed into the soil from post-harvest and burning activities.

Cumulative Effects

The expected cumulative effects of implementing these management actions and the proposed action are to continue improving forest health, and reducing the potential for stand-replacing wildfires. This would minimize the effects of raindrop impact, soil erosion, reduced soil productivity, overland flow, and sedimentation to area streams. Infiltration of water into soils with adequate storage capacity would maintain typical flow rates in area streams.

3.6. Wildlife

The effects of the alternatives are compared in a qualitative analysis based on expected changes in the environment. Changes in wildlife habitat are evaluated in both the short- and long-term, focusing on key issues such as cover, food, water, and reproductive/rearing habitats (nesting/denning/calving etc.). The species analyzed under this section were either identified through public concern, the effect of the proposed activities on threatened, endangered, proposed, and USFS sensitive species, as well as Management Indicator Species (MIS).

Regulatory And Forest Plan Direction

The Forest Plan guidance for management of wildlife relevant to the proposed action include the following within each management area:

Aspen Management (4D) emphasizes maintaining and improving aspen sites. Other tree species, if present are de-emphasized. Aspen is managed to produce wildlife habitat, wood products, visual quality, and plant and animal diversity. Aspen clones are maintained. On larger areas, a variety of aspen stand ages, sizes, shapes, and interspersions are maintained. Even-age management is practiced and is achieved by clear-cutting. Diversity objectives are achieved by varying the size, age, shape and interspersion of individual stands. Individual treatments are generally smaller than 40 acres.

Livestock Grazing (6B) emphasizes management for livestock Conflicts between livestock and wildlife are resolved in favor of livestock. Range condition is maintained through use of forage improvement practices, livestock management, and regulations of other resource activities. Management activities are evident but harmonize and blend with the natural setting.

Terrestrial Habitat Description

Elevations range from approximately 9,100 feet (ft) to 9,800 ft. Topography varies from moderately steep forested ridges to gently rolling benches and mountain parks. The primary vegetation communities within the project area are displayed below (Tables 3.6.1 and 3.6.2 below).

Table 3.6.1. Vegetation Communities for the Herring Park Project

Vegetation	Approximate Acres
Aspen	731
Blue spruce	79
Bristlecone pine	5
Cottonwood	5
Douglas-fir	2442
Meadow	2859
Mount Mahogany	37
Pinon / Juniper	9
Ponderosa pine	964
Willow	38
Total	**7169**

Table 3.6.2. Proposed treatment acres by vegetation cover type

Vegetation Type	Proposed Treatment	Approximate Acres
Aspen	ASPEN (Dry)	56
	ASPEN (Moist)	42
	RxF	472
	Total	570
Douglas-fir	THIN/SAN/RxF	1115
	THIN/SAL/RxF	718
	SAL/RxF	256
	RxF	27
	Total	2116
Meadow	RX	2207
	Total	2207
Ponderosa pine	THIN/SAN/RxF	331
	THIN/SAL/RxF	335
	SAL/RxF	11
	PLANTATION/THIN/RxF	204
	Total	880
Total		**5773**

The following treatment descriptions are RxF (Prescribe Fire), THIN (Thinning), SAL (Salvage) and SAN (Sanitation).

Much of the western portion of the project area is comprised of stands of beetle killed pine and spruce bud-worm killed conifer. Bug kill in these forested areas has resulted in a more open canopy which has created more diversity and higher vigor in the grass and forb communities in the understory. These areas produce a considerable amount of grass that established naturally following the die-off in the conifers.

Ponderosa pine plantations (40-50 years old) occur along the lower slopes of the western edge of Herring Park and are lacking a vigorous grass, forb and shrub component in the understory due to the high canopy closure resulting from high tree stocking rates. These plantations were apparently established as part of a watershed improvement effort in the 1960's however, the location of these plantations appear to have been open rangeland in the past, since no stumps or coarse woody debris occur on the forest floor that would indicate a previously forested condition. Grass and forb production and vigor is lower in these stands than in adjacent stands where canopy cover is much lower.

Stringers of aspen occur in many of the drainages and patches of aspen exist on benches throughout the project area. There is a variety of age classes present in the aspen though most of the larger diameter aspen are found in the moist site drainage bottoms (stringers). Many of the larger diameter trees are providing habitat for cavity nesting species. Some of these aspen stands are being encroached by conifer (mostly in the western portion of the project area). Dry site stands of aspen occur on the transitional edge of Herring Park. These stands are more pure in nature with little encroachment from conifer.

The southern and eastern portion of the project area is comprised of mostly large, green ponderosa pine with small patches of recent mountain pine beetle kill. There is a mosaic of dense and open stands with an understory of grasses, forbs, and shrubs and a component of aspen. Mountain mahogany is a desirable wildlife forage species present in this area as well.

There are a high number of snags in the project area that have been created due to recent insect infestations within the project area. Different species of wildlife require varying size, type, number, condition and distribution of snags. Ponderosa pine snags created by MPB infestation do not tend to remain standing in the long term (past 10 years) and many have already fallen to the ground. Douglas fir snags tend to remain standing longer (past 10 years) as is evident within the project area. Coarse woody debris (CWD) in portions of the project area is high due to the falling of older mountain pine beetle killed trees.

Pronghorn antelope and mule deer also occur. An active red tailed hawk nest was observed within the project area during wildlife surveys in 2006. Other wildlife related items to note in the area include high levels of spruce bud worm and mountain pine beetle infestation which has resulted in an increased number of dead trees and opening of the forest canopy.

Aquatic Wildlife Habitat

No aquatic MIS occur in the project area due to the lack of perennial streams. Water sources are limited for wildlife within the project area, which may affect the distribution of some species of wildlife. Riparian areas and hydrological effects will be addressed under the hydrological section.

Management Indicator Species

The National Forest Management Act (NFMA) of 1976 requires that national forest planning "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." To carry out this mandate, in 1982 the USFS developed and implemented regulations that require selection of Management Indicator Species (MIS) to be used as planning and analysis tools to set goals, objectives, and minimum management requirements in Forest Plans; focus analysis of effects of plan alternatives; and monitor the effects of plan implementation at the project level.

Specifically, the regulations state that "these species shall be selected because their population changes are believed to indicate the effects of management activities" (36 CFR 219.19). They are not intended to provide special protective status, serve as biological diversity benchmarks, or represent every species of plant or animal found in the forest.

Amendment 30 to The Land and Resource Management Plan for the PSICC (Forest Service 2005) identified four MIS for the Pike and San Isabel National Forests. All species analyzed are identified in Table 3.6.3.

Table 3.6.3 Management Indicator Species for the Pike and San Isabel National Forests with the potential to occur within the project area.

Species	Species expected in project area?	Habitat affected by project?	Further evaluation as MIS?	Primary Habitat type
Abert's Squirrel	Yes	Yes	Yes	Mature Ponderosa Pine
Brook Trout	No	No	No	Beaver Ponds, Streams
Elk	Yes	Yes	Yes	Widespread
Greenback Cutthroat Trout	No	No	No	High elevation lakes/streams

Species not expected in the project area and not affected by project activities will not be analyzed further.

Abert's Squirrel (Sciurus aberti)

Affected Environment

Abert's squirrel is ecologically dependent on ponderosa pine (pinus ponderosa), with open understory for both nesting sites and food (Keith 1965) and therefore generally limited to open montane forests. Target feed trees represent less than 10% of the trees in stands populated by Abert's squirrel along the front range, and they are chemically and physiologically different from trees not used (Allred and Gaud 1994). Tree chemistry also affects nest-site selection. On the PSICC, surveys show approximately 92% of nests were in a tree group with 75% having 3 or more interlocking canopy trees. As a result, Abert's squirrels, which are closely associated with mature ponderosa pine, are expected to decline in the Herring Park area because of these natural factors until suitable habitat reestablishes. Current habitat in the project area was approximately 880 acres before recent beetle activity. Approximately 380 acres of ponderosa pine in the project area are currently uninfested with mountain pine beetle. With the recent fieldwork conducted in 2003 and 2004, a protocol is being refined for Abert's squirrel to be monitored at the Forest scale.

Table 3.6.4. Acres of potential Abert's squirrel habitat at multiple scales.

Habitat Quality*	Project Area[1]	Salida RD[2]	San Isabel NF[2]	PSICC[2]
High	**580**	**16,000**	**33,000**	**156,000**
Moderate	**210**	**7,000**	**16,000**	**70,000**
Forage	**90**	**4,000**	**9,000**	**36,000**
Total	880	27,000	58,000	262,000

*All habitat structural stages (HSS) are for ponderosa pine habitats only.
High quality = HSS 4B, 4C or 5, Moderate quality = HSS 4A, Forage = HSS 3A, 3B, or 3C
Vegetation information was obtained from CVU data where available and RIS data for all other areas.

Environmental Consequences

No Action Alternative

Under this alternative, there would be no thinning or fuels reduction. MPB in conjunction with extended drought in the area have resulted in extensive mortality of ponderosa pine in the vicinity. If the currently uninfested ponderosa pine stands remain at current densities, they could be more susceptible to attack by MPB. MBP are in the area of the uninfested stands, and it is likely that areas of infestation will grow within the next couple of years based on the rate of spread observed in the project area. If this were to occur, the remaining 380 acres of Abert's squirrel habitat would be further reduced.

Proposed Action Alternative

Because of recent MPB attacks, there are only 380 acres of live ponderosa pine habitat remaining within the area. Ponderosa pine habitat would be favored in the thinning process to help establish larger diameter trees over a shorter time period and enhance potential Abert's habitat. The proposed treatments are designed to reduce the susceptibility of mountain pine beetle attacks. Thinning of smaller diameter ponderosa pine would reduce stand densities further, and would also promote growth and speed the production of suitable Abert's habitat for the area.

Suitable habitat is low in relation at the rest of the Forest (Table 3.6.4). Design criteria are in place to maintain feeding and nesting trees within the 380 acres of remaining suitable habitat. Though potential Abert's habitat in the treatment area is low in relation to that available on the Salida RD, San Isabel Forest, and PSICC unit (Table 3.6.4). Over the longer term, as mature ponderosa pine re-establishes, Abert's habitat is expected to increase.

Cumulative Effects

Given the recent MPB outbreak and resulting ponderosa pine mortality, squirrel populations on the PSICC will likely decline and range expansion will subside or retract until quality Abert's habitat stabilizes. Potential Abert's habitat in the treatment area is low in relation to that available on the Salida RD, San Isabel Forest, and PSICC unit (Table 3.6.4), and the proposed project would not result in a loss of viability for the species over the planning area as a result of this project. The limited extent and the short-term effects of the proposed action alternatives are not expected to interact with any other past, present or foreseeable future actions within the project area in a manner that would produce a collectively significant effect on MIS habitat or population viability over the planning area.

Therefore, there are no anticipated additional cumulative effects to existing MIS habitats or populations from the implementation of the actions proposed in the Herring Park Project. Refer to the Herring Park BE for a detailed list of additional cumulative effects and impacts to wildlife species.

Elk (Cervus elaphus)

Affected Environment

Elk tend to inhabit coniferous forests associated with rugged, broken terrain or foothill ranges. During summer elk spend most of their time in high mountain meadows in the alpine or subalpine zones or in stream bottoms (Adams 1982). Elk may use more open areas during spring and summer because of earlier spring green-up (Edge et al. 1987). During hot summer months, elk seek shaded, cool habitats (Leege 1984).

Use of forage areas depends on proximity to cover. Use is typically concentrated to within 200 to 600 ft of cover edge. Summer and winter range for elk encompasses the entire project area. Winter range and calving areas include approximately 7,000 acres (100%) and 155 acres (2%) of the project area, respectively (CDOW 2005). The Herring Park project area represents approximately 3% and 1% of the elk winter range on the Salida District and San Isabel NF respectively (Table 3.6.5 below).

Table 3.6.5 Potential Elk Winter Range at the Project Area, District and Forest Scales.

MIS Species	Acres of Potential Winter Range on Nation Forest Lands			
	Project Area[2]	Salida RD[3]	San Isabel NF[3]	PSICC[3]
Elk[1]	7,000	210,000	480,000	820,000

[1]Elk winter range obtained from CDOW GIS coverage's and clipped to the FS ownership.

Open road densities greater than 1.5 miles per square mile of habitat on summer range or one mile per square mile of habitat on winter range are also considered a limiting factor (Rodrick and Milner 1991). Open road densities for the Herring Park area are currently at 1.4 miles per square mile for summer and winter. Design criteria are in place to restrict travel on temporary roads and restrict logging truck travel through concentrated winter elk habitat during the winter months.

Colorado elk populations are known to be increasing. Elk are expanding their range due to reintroductions, management, and habitat conversion (COVERS 2001).

Environmental Consequences

No Action Alternative

Insect and disease infestations in the ponderosa pine and Douglas fir have caused tree mortality in patches of these stands which has created openings in the canopy. Grass and forb communities have increased in both production and vigor within the project area. Proposed treatments are expected to further increase openings in the canopy and allow more light to reach the forest floor, as well as invigorate grass and aspen. Typically, an increase in herbaceous vegetation is the result of opening the forest canopy in the short-term resulting in increased forage. Given the wide distribution, abundance, increasing population trend, and game status of elk, there are no viability concerns.

Proposed Action Alternative

Proposed treatments are expected to further increase openings in the canopy and allow more light to reach the forest floor, as well as invigorate grass and aspen. Typically, an increase in herbaceous vegetation is the result of opening the forest canopy in the short-term resulting in increased forage.

The treatment areas are within elk winter range and calving areas, but the project area is only a small portion of these habitats available in the immediate vicinity and the district (Table 3.6.3). No new permanent roads would be constructed with this project and any temporary roads constructed will have limited access for administrative uses only (closed to the general public) during treatment operations.

Treatments are not expected to result in a measurable change in elk populations or trends. Given the wide distribution, abundance, increasing population trend, and game status of elk, there are no viability concerns. Design criteria are in place to maintain elk hiding cover. Elk forage quality and quantity would decrease as canopy closure increases, but should have no measurable impact on the population due to the availability of quality habitat surrounding the project area.

Cumulative Effects

The proposed action and future actions (North Trout Creek, Black Trout Projects) adjacent to the Herring Park area will not result in a measurable change in elk populations or trends, but may alter distribution.

The limited extent and the short-term effects of the proposed action alternatives are not expected to interact with any other past, present or foreseeable future actions within the project area in a manner that would produce a collectively significant effect on MIS habitat or population viability over the planning area. Therefore, there are no anticipated additional cumulative effects to existing MIS habitats or populations from the implementation of the actions proposed in the Herring Park Project. Refer to the Herring Park BE for a detailed list of additional cumulative effects and impacts to wildlife species.

Wildlife Special Status Species

The Biological Evaluation (BE) for this project is included in Appendices B. This document includes more detailed analysis of special status species within the project area. The following sections summarize the analyses of the BE.

This biological evaluation (BE) / biological assessment (BA) analyzes the potential effects of the proposed Herring Park Project within the Salida Ranger District (District) on the San Isabel National Forest (Forest) on federally listed threatened, endangered, and candidate species, and designated or proposed critical habitats pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (ESA). In addition, impacts from the proposed management action on Forest Service (FS) sensitive species identified by the Region 2 Regional Forester (Forest Service 2005) will also be assessed as required in the Forest Service Manual (FSM 2670.31-2670.32).

Colorado Natural Heritage Program Element Occurrence Records

The Colorado Natural Heritage Program database (CNHP 2005) was reviewed to identify element occurrence records within the action area. No element occurrences are located within the analysis area. In addition, files from the Salida District and Forest were reviewed for known species locations. One historic goshawk nest is known to occur 1 mile outside of the project area to the west. No element occurrences are located within the analysis area.

Federally Listed and Candidate Species and FS Sensitive Species

A species list from the USFWS (dated December 2006) with all federally listed and candidate species within Park, Fremont and Chaffee counties in Colorado was reviewed for this analysis. In addition, the Region 2 Sensitive Species list (Forest Service 2005) was also reviewed for Forest Service sensitive species. Using these lists, we determined which of those species had a potential to occur within our administrative boundaries (shown in Table 3.6.4. below). The table also gives a very brief summary of federally listed/candidate species, critical habitat, and Forest Service sensitive species' habitat requirements and known occurrence information of species which are known to or may occur on the District and/or Forest.

Species not known or with no potential of occurring on the District was documented with rationale in the following document: *Threatened, Endangered, and Forest Service Sensitive Species of the San Isabel National Forest* (Wrigley et al. 2006). A list of species known or with a potential to occur or be affected by the proposed action is shown in the table below, and those marked with no potential to occur, will not be discussed further in this document. Excluded species have been dropped from further analysis by meeting one or more of the following conditions:

1. occurs in species habitats that are not present in the project area;
2. occurs in habitats that would not be impacted by the proposed activities;
3. is outside of the geographical or elevation range of the species;
4. species do not occur nor is expected in the project area during the time period activities would occur.

Critical Habitat

There is no proposed or designated critical habitat for any federally listed or proposed species within the analysis area; therefore, there will be no direct, indirect, or cumulative effects to any critical habitat will occur and critical habitat will not be addressed further in this assessment.

Table 3.6.6 Threatened, endangered, candidate/proposed, and Forest Service sensitive species with the potential to occur within the analysis area on the San Isabel National Forest.

[1]**Status Codes**: **E**=federally listed endangered; **T**=federally listed threatened; **C**= federally proposed/candidate for listing; and **S**=Forest Service sensitive

[2]**Exclusion Rationale Codes**: **ODR**=outside known distributional range of the species; **HAB**= no habitat present in analysis area; **ELE**= outside of elevation range of species; **INV**= presence of non-native salmonids.

Species Common and Scientific Name	Status[1]	Potential to Occur	Rationale for Exclusion[2]	Habitat Description and Range in Colorado
INVERTEBRATES				
Caddisfly *Ochrotrichia susanae*	S		HAB	springs and seeps found in Chaffee and Park Counties
Hudsonian emerald *Somatochlora hudsonica*	S		ODR, HAB	boggy wetlands, streams, ponds, & reservoirs are breeding sites, documented in Lake County; however, distribution in CO is unknown, populations appear to be disjunct.
Rocky mountain capshell snail *Acroloxus coloradensis*	S		HAB	littoral zone of oligotrophic and mesotrophic mountain lakes with neutral to slightly alkaline water and high dissolved oxygen content; 8,800-9,800 ft.
Uncompahgre fritillary butterfly *Boloria acrocnema*	E		ODR, HAB, ELE	known to only occur above timberline on Mt. Uncomaghre, laying eggs on snow willow (*Salix nivalis*); potentially occurring in Custer and Saguache counties.
FISH				
Greenback trout *Oncorhynchus clarki stomias*	T		HAB	well-oxygenated headwaters of mountain streams, restricted to 7 drainages on Pike-San Isabel NF; found in Custer, Douglas, El Paso, Huerfano, Lake, Park, and Pueblo counties.
AMPHIBIANS AND REPTILES				
Boreal toad *Bufo boreas boreas*	S		HAB	breeds in ponds & over winter in refugia within lodgepole pine, spruce-fir forests, & alpine meadows; 7,500-12,000 ft.
Northern leopard frog *Rana pipiens*	S		HAB	banks & shallow portions of marshes, ponds, lakes, reservoirs, beaver ponds & streams, especially those with rooted aquatic vegetation up to 11,000 ft.
Plains leopard frog Rana blairi	S		ODR, HAB	margins of streams, natural and artificial ponds, reservoirs, creek pools, irrigation ditches and other water bodies in plains grassland, sandhills, stream valleys, or canyon bottoms. Elevations below 6,000 ft.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS[1]	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION[2]	HABITAT DESCRIPTION AND RANGE IN COLORADO
BIRDS				
American peregrine falcon *Falco peregrinus anatum*	S		HAB	wide variety of habitats, selects cliff ledges or rock outcroppings for nesting, preferring high, open cliff faces that dominate the surrounding area.
American three-toed woodpecker ***Picoides dorsalis***	S	√		**mature or old-growth spruce-fir forest, but also occurs in ponderosa pine, Douglas-fir, & lodgepole pine forests with abundant snags and insect populations are present due to outbreaks from disease or fire.**
Bald eagle *Haliaeetus leucocephalus*	T		HAB	near open water including rivers, streams & lakes, nesting & roosting in large ponderosa pine, Douglas-fir, or cottonwood trees in proximity to open water and rivers.
Black swift *Cypseloides niger*	S		HAB	nests on cliffs near or behind high waterfalls.
Boreal owl *Aegolius funereus*	S		HAB	high elevation, subalpine mature & old-growth coniferous woodlands, including mature Engelmann spruce, subalpine fir or spruce/fir-lodgepole pine forests, interspersed with meadows, nesting in cavities in trees larger than 15 in dbh.
Brewer's sparrow *Spizella breweri*	S		HAB	Sagebrush, mountain meadows, and mountain shrub habitat in CO.
Flammulated owl ***Otus flammeolus***	S	√		**old-growth or mature ponderosa pine, ponderosa pine, & Douglas-fir forests, often mixed with mature aspen, nesting in cavities, feeding on insects.**
Gunnison sage grouse *Centrocercus minimus*	S		HAB	tall dense stands of sagebrush near wet meadows with tall grasses for hiding; occurring primarily in SW & W CO, but also including Saguache & S Chaffee County.
Lewis' woodpecker *Melanerpes lewis*	S		HAB	lowland & foothill riparian forests, agricultural areas, urban areas with tall deciduous trees, & foothills including Wet Mountains & grasslands
Loggerhead shrike ***Lanius ludovicianus***	S	√		**open riparian areas, montane meadows, agricultural areas, grasslands, shrublands, & piñon/juniper woodlands in western valleys in E CO**
Mexican spotted owl ***Strix occidentalis lucida***	T	√		**steep-sided canyons with old-growth mixed conifer forests, nesting on cliff ledges or caves along canyon walls in shady/cool canyons of the piñon/juniper zone; SW CO**
Northern goshawk ***Accipiter gentilis***	S	√		**primarily forest habitat, especially in mountains, nesting in lower portions of mature Douglas-fir, ponderosa pine, lodgepole pine, or aspen canopies; prefers mature or old-growth forest structure.**
Northern harrier ***Circus cyaneus***	S	√		**spring & fall migrant in western valleys mountain parks, and eastern plains in CO inhabiting grasslands, agricultural areas, marshes & tundra in fall; 3,500-13,000 ft.**

SPECIES COMMON AND SCIENTIFIC NAME	STATUS[1]	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION[2]	HABITAT DESCRIPTION AND RANGE IN COLORADO
BIRDS				
Olive-sided flycatcher *Contopus cooperi*	S		HAB, ELE	mature spruce-fir & Douglas-fir forests, especially on steep slopes or near cliffs, near bogs & meadows during the summer, 10,000-11,000 ft.
Purple martin *Progne subis*	S		HAB	old-growth & aspen forests near parks, generally near water; 6,500-10,000 ft in the summer, nesting in colonies in tree cavities or man made structures
White-tailed ptarmigan *Lagopus leucurus*	S		HAB, ELE	Inhabit alpine tundra with moist, low-growing alpine vegetation, particularly willows (Salix ssp.), with boulders, in proximity of water.
Yellow-billed cuckoo *Coccyzus americanus*	S		ODR, HAB	Eastern subspecies: riparian forests along the Arkansas River & urban areas with tall trees; rare to uncommon spring/fall migrant & summer resident of E CO & SW KS
MAMMALS				
American marten *Martes americana*	S		HAB	spruce-fir & lodgepole pine mature to old-growth forests with moderate to high density canopy closures & abundant snags & logs; 8,000- 13,000 ft.
Canada lynx *Felix lynx canadensis*	T		HAB	dense spruce-fir, Douglas-fir, early seral lodgepole pine, mature lodgepole pine with developing understory of spruce-fir & aspen in subalpine zone & timberline, using caves, rock crevices, banks, logs for denning, closely associated with snowshoe hare.
Common hog-nosed skunk *Conepatus leuconotus*	S		ODR, HAB	grasslands & foothills, prefers partly wooded, brushy, rocky area; SE & south-central CO.
Fringed myotis bat *Myotis thysanodes*	S	√	ODR, HAB	**rocky outcroppings in mid-elevation ponderosa pine, piñon/juniper, oak, & mixed conifer woodlands, grasslands, deserts, & shrublands; Baca, El Paso, Huerfano, Las Animas, Otero, & Pueblo counties.**
Gunnison's prairie dog *Cynomys gunnisoni*	S		HAB	shrub-grassland habitats in SW CO in mesic plateaus and intermountain valleys, benches, and arid lowlands.
Pygmy shrew *Sorex hoyi*	S		ODR, HAB	occupies a wide variety of habitats in the mountains of eastern CO at elevations above 9,600 ft., there are no mountains over 9,600 ft. In Eastern Colorado such as subalpine forests, edges of meadows, bogs, willow thickets, aspen-fir forests, and parklands.
Rocky mountain bighorn sheep *Ovis canadensis canadensis*	S	√		**prefers semi-open, precipitous terrain characterized by a mixture of steep and gentle slopes, broken cliffs, rocky outcrops, and canyons**
Townsend's big-eared bat *Plecotus townsendii*	S	√		**typically associated with caves & abandoned mines for day roosts & hibernacula, will also use abandoned buildings in western shrubland, pinon - juniper woodlands, & open montane forests in elevations up to 9,500 ft.**

SPECIES COMMON AND SCIENTIFIC NAME	STATUS[1]	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION[2]	HABITAT DESCRIPTION AND RANGE IN COLORADO
MAMMALS				
Wolverine *Gulo gulo*	S		HAB	alpine & subalpine mature/intermediate timbered areas around natural openings, including cliffs, slides, basins, & meadows, dependant on ungulates, historically in CO, extending the length of the Rocky Mts.

Only those federally threatened, endangered. Proposed and FS sensitive species with the potential to occur on the Forest that could potentially be affected by this project (evaluated species) as shown in the above table are addressed hereafter in this assessment.

Environmental Consequences

Mexican Spotted Owl (*Strix occidentalis lucida*)

Affected Environment

A comprehensive discussion of Mexican spotted owl distribution, natural history and threats can be found in the *Recovery Plan for the Mexican Spotted Owl* (FWS 1995). The project area does not occur within designated critical habitat. The nearest known owl protected activity center (PAC) is the Rock Creek PAC 50, near Colorado Springs approximately 40 miles from the project area. The PAC is generally an area of 600 acres total, which includes nesting and foraging habitat. The project area is lacking many of the primary habitat components needed by the owl (e.g. large diameter trees, high canopy cover, steep canyons and rock). Although surveys for Mexican spotted owls have been conducted in suitable habitat on the Salida Ranger District in the past, no owls have been documented. A vocalization from a Mexican spotted owl heard near Turret, in May of 2005, was reported to Leslie Ellwood, USFWS (Ellwood 2006). Turret is located just north of Salida in the Arkansas foothills, approximately 5 air miles from the project area. Follow up surveys were conducted by Forest Service biologists in 2006, however no owls were detected.

No Action Alternative

Natural processes would be expected to continue within the project area. The project area is lacking many of the primary habitat components needed by the owl (e.g. large diameter trees, high canopy cover, steep canyons and rock) for nesting and roosting, however natural processes in the short term would result in increased down woody debris and increased grass and forb production which would favor habitat for small mammal prey species of the Mexican spotted owl. As owls increase in numbers and distribution increases, the project area may potentially provide foraging habitat for Mexican spotted owl that may disperse to potential nesting habitat located 5-10 miles (Arkansas foothills) southwest of the project area.

Risk of larger scale stand replacement fires may increase in the short term (approximately two years) when trees are dead and dry needles remain on the trees. The risk of these stand replacing fires may then actually drop for a period of decades as dead trees create openings or gaps in the canopy and reduce canopy continuity. As accumulation of course woody debris and regeneration in the understory increases, it creates ladder fuels that may increase risk of high intensity fire 20-50 years following the insect outbreak if conditions are right (Romme et al 2006).

Determination:
May affect, but not likely to adversely affect. For a more detailed rationale of the determination for Mexican spotted owl, please refer to the BE/BA in Appendix B.

Proposed Action Alternative
The biggest effect on this species would be the removal of snags and course woody debris, reduced tree understory, density, and canopy cover. Approximately 2100 acres of Douglas fir and 880 acres are planned for a combination of salvage, thinning, and prescribed fire. Where steep slopes exist, Recovery Plan Guidelines for steep slopes (outside of PACS) would be implemented. Within mixed conifer, no harvest of trees >22.4 cm (9 inches) on any slopes > 40% where timber harvest has not occurred in the past 20 years would be implemented. Climatic and topographic factors influence the capability of the site to achieve the target/threshold standards for mixed conifer stands within the project area.

Salvage, thinning and prescribed fire treatments would favor retention of large diameter trees in the mixed conifer, though; overall density of trees would be reduced in an effort to reduce risk of live stands to insect infestation. Opening of the canopy would increase grass and forb production which would favor habitat for small mammal prey species of the Mexican spotted owl. Dead tree removal would lessen the availability of downed logs for hiding and nesting habitat of small mammals however, design criteria are in place to mitigate the removal of dead trees by retaining both snags and downed logs at 30 trees per 5 acres and recruitment snags (green trees) at 10 trees per 5 acres. As owls increase in numbers and distribution increases, the project area could provide foraging habitat for MSO that could disperse to potentially suitable nesting habitat located approximately 5-10 miles (Arkansas foothills) southwest of the project area.

Cumulative Effects
The *Recovery Plan* (USFWS 1995) states that the Southern Rocky Mountains – Colorado Recovery Unit contains only 1.8% of the known owl sites. The *Recovery Plan* indicates that the greatest risk to the owl is from catastrophic fire and the continued use of even-aged timber management. Hazardous fuels reduction treatments have been completed and are being planned on State, private and public lands within the ponderosa pine/Douglas fir zone throughout Colorado to reduce the risk of catastrophic crown fires. All Federal actions have and would consider the needs of the Mexican spotted owl. Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. It is unlikely that activities proposed in the Herring park project would contribute to adverse cumulative effects on the owl.

Determination:
May affect, but not likely to adversely affect. For a more detailed rationale of the determination for Mexican spotted owl, please refer to the BE/BA in Appendix B.

Three-toed woodpecker (*Picoides tridactylus*)

Affected Environment

In Colorado, the species is restricted to the western half of the state, being rare or locally uncommon in the higher mountains and rare in the lower mountains (Andrews and Righter 1992). The three-toed woodpecker is a primary cavity nester. This woodpecker inhabits primarily spruce-fir forest, but where insect populations are high as a result of fires or large die-offs due to insect infestation or disease, it may also occur in ponderosa pine, and Douglas-fir, forests which are evident within the Herring Park area. History of fire suppression has lead to fewer large-scale burned over areas, but has also lead to highly favorable conditions for infestations of the cambium wood-boring insects that this species primarily feeds upon.

No Action Alternative

There is no habitat in the project area classified as spruce-fir in the project area, however, the abundant mountain pine beetle population in the project area and surrounding areas would likely be attractive to three-toed woodpeckers. Natural processes are likely to favor habitat conditions for this species in the short term (1-10) years and the long term (10 plus) years as mountain pine beetle continues to expand within the project area. Risk of larger scale stand replacement fires may increase in the short term (approximately two years) when trees are dead and dry needles remain on the trees. The risk of these stand replacing fires may then actually drop for a period of decades as dead trees create openings or gaps in the canopy and reduce canopy continuity (Romme et al. 2006). As accumulation of course woody debris and regeneration in the understory increases, it creates ladder fuels that may increase risk of high intensity fire 20-50 years following the insect outbreak if conditions are right (Romme et al. 2006). All of these processes would be beneficial to perpetuating habitat for the three toed woodpecker.

Determination:

Beneficial impact. For a more detailed rationale of the determination for three-toed woodpecker, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

The biggest impact to this species would be the removal of snags. This woodpecker is associated with snag abundance and insect outbreaks from disease or fire. While maintaining an average of 40 snags/downed logs (course woody debris) and snag recruitment trees per 5 acres may provide some habitat for these species, future habitat quality would be lowered by reducing the overall high concentration of snags and insects. Because ponderosa pine and Douglas fir stands are not this species primary habitat, it would be unlikely that the project area would be as attractive to the woodpecker as snag abundance and insect outbreaks are diminished.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing and anticipated future timber harvest and fire suppression within areas of suitable habitat have the greatest cumulative effect that will directly and indirectly affect these species. In particular, habitat modification from the removal of snags, course woody debris, and large trees may adversely affect this species and add to the cumulative effects.

Determination:
May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for three-toed woodpecker, please refer to the BE/BA in Appendix B.

Flammulated owl (*Otus flammeolus*)

Affected Environment

Flammulated owls are associated with mature (greater than 150 yrs) to old-growth (greater than 200 yrs) ponderosa pine and ponderosa-Douglas-fir forests, often mixed with mature aspen, and has been observed in pure aspen stands. These owls will apparently forage in grassland-forage edges as well as in tree crowns. Flammulated owls are secondary cavity nesters that use a variety of mature tree species as long as there are cavities, an open forest structure for foraging on insects, and brush/dense foliage for roosting.

Insect infestation, in conjunction with extended drought in the area, have resulted in extensive mortality of ponderosa pine / Douglas-fir within the project area and surrounding areas. As a result, flammulated owls, which are closely associated with mature ponderosa pine, are expected to decline in the area because of these natural factors until suitable habitat reestablishes.

No Action Alternative

Under this alternative, there would be no mechanical thinning, fuels reduction or prescribed fire. Insect infestation, in conjunction with extended drought in the area, have resulted in extensive mortality of ponderosa pine in the project area and surrounding areas. As a result, flammulated owls, which are closely associated with mature ponderosa pine, are expected to decline in the area because of these natural factors until suitable habitat reestablishes. Current Douglas-fir stands make up approximately 2400 acres of the project area. Insect killed trees are widespread throughout most of the Douglas fir stands which has reduced the density of trees and canopy cover in this habitat. Current ponderosa pine stands make up approximately 900 acres. Approximately 380 acres of ponderosa pine in the project area are currently uninfested with mountain pine beetle (MPB). The currently uninfested stands of ponderosa may be more susceptible to attack by MPB because of high density, drought stress and competition. MPB are in the vicinity of the uninfested stands, and it is likely that the beetles will spread to these stands within the next couple of years based on the rate of spread observed within and around the project area. If this were to occur, flammulated owl foraging habitat would be further reduced in the short term, however nesting opportunity would increase. As stands of ponderosa pine, Douglas fir and aspen regenerate, flammulated owl foraging and nesting habitat would increase.

Determination:
May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for flammulated owl, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

Under this alternative the biggest effect on this species would be the removal of snags, course woody debris, reduced tree understory density, and canopy cover. Flammulated owls use snags for nesting. Design criteria to mitigate the removal of dead trees by retaining both snags and downed logs at 40 snags/downed logs per 5 acre would provide habitat for these species.

Current and future habitat quality may be lowered by reducing the amount of snags and course woody debris in the short term (1-10 years) and long term (10 plus years). Mountain pine beetle are expected to continue to move throughout the project area as remaining live ponderosa pine stands are more susceptible to infestation because of high tree densities, drought stress and competion. The proposed treatments would reduce tree density in an effort to lessen the susceptiblity to mountain pine beetle. A more open stand structure could be beneficial for flammulated owl foraging as long as remaining habitat requirements are still met.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing and anticipated future timber harvest and fire suppression within areas of suitable habitat have the greatest cumulative effect that will directly and indirectly affect these species. In particular, habitat modification from the removal of snags, course woody debris, and large trees may adversely affect these species and add to the cumulative effects. Each of these actions would increase habitat fragmentation and remove suitable habitat as discussed above. It is unlikely that activities proposed in the Herring park project would contribute to adverse cumulative effects on the owl.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for flammulated owl, please refer to the BE/BA in Appendix B.

Loggerhead shrike (*Lanius ludovicianus*)

Affected Environment

Shrikes are migrant and summer residents and primarily inhabit open riparian areas, agricultural areas, grasslands, and shrublands, especially semi-desert shrublands, and sometimes piñon-juniper woodlands. Shrikes eat mostly insects, but vertebrates such as birds, reptiles (lizards), frogs, and toads also make up a significant portion of their diet. Shrikes are found to have breeding sites at elevations ranging from below 4,000 ft to possibly as high as 8,900 ft (Kingery 1998). Nearly all breeding occurs below 8,900 ft elevation (Andrews and Righter 1992). There are no confirmed breeding records in the mountain parks or mountains.

No Action Alternative

Though breeding birds are rarely found above 8,900 feet in elevation, potential habitat does exist within the project area, primarily on private land. Insect infestation would continue to increase openings and create greater potential for foraging birds on Forest lands surrounding the private land habitat. But, given the rare occurrence of loggerhead shrikes (Andrews and Righter 1992) in the area, natural processes are unlikely to greatly influence their distribution or use of the project area.

Determination:
No impact. For a more detailed rationale of the determination for loggerhead shrike, please refer to the BE/BA in Appendix B.

Proposed Action Alternative
Conducting prescribed burns in meadow habitats could displace individuals if they are using the area during burning. Prescribed burns in the project area would be relatively small and similar unburned meadow habitats would remain in the vicinity. Given the rare occurrence of loggerhead shrikes (Andrews and Righter 1992) in the area, small temporal and spatial impacts to potential habitats and availability of untreated habitats in the vicinity it is unlikely that the activities proposed in this alternative would have any measurable effect on shrikes.

Cumulative Effects
Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the grazing and fire suppression has had, and likely continues to have, the greatest cumulative direct and indirect cumulative effect on this species. The current MPB outbreak and subsequent logging across the area will alter habitat composition, ultimately creating a more open forest structure. Each of these activities and actions would increase meadow habitat and possibly shrub habitat to some degree as discussed above.

Determination:
No impact. For a more detailed rationale of the determination for loggerhead shrike, please refer to the BE/BA in Appendix B.

Northern goshawk (*Accipiter gentilis*)

Affected Environment
Most goshawk nests on the Salida Ranger District are located within aspen dominated stands. Approximately 1300 acres of potential nesting habitat was surveyed for presence of goshawks. Goshawks were not detected nor any goshawk nests located within the project area during surveys conducted in 2006 however; a historic nest is known to occur approximately 1 mile west of the project area.

Many of the larger aspen stands within the project area are small dry site stands bordering open meadow. Smaller stands that contain some of the larger diameter aspen trees occur as narrow stringers within some of the drainages and are surrounded by stands of conifer that contain high levels of insect infestation and dead tree component. Some of these aspen stands have also been encroached by conifer. Stands that contained the highest canopy cover of live ponderosa pine and aspen were located in the southern portion of the project area and contained the best potential goshawk habitat within the project area. Small MPB infestations are in the vicinity of the uninfested stands, and it is likely that the beetles will spread to these stands within the next couple of years based on the rate of spread observed within and around the project area.

No Action Alternative

Natural processes are increasing openings in the canopy of conifer stands which would increase the opportunity for regeneration of aspen. Natural processes would result in increased course woody debris and increased grass and forb production which would favor habitat for small mammal prey species of the goshawk. Aspen stands currently being encroached by conifer are likely to expand as adjacent conifer stands continue to be infested by insects and trees die back. Diversity of bird and other prey species in the area are likely to change spatially within the project area as this transition occurs.

Natural processes are creating a mosaic of open patches and variable stand densities which could increase foraging success and improve the area as quality goshawk habitat. Stands that are more open would also improve habitat conditions for prey species (primarily passerines) which will ultimately benefit goshawks. As mountain pine beetle continues to spread to the southern portion of the project area, potential nesting habitat would be further reduced in the project area, however foraging opportunity is likely to increase. Goshawks nesting in areas adjacent to the project area could benefit from this increased foraging opportunity currently; and as stands regenerate, nesting habitat is likely to improve within the project area to provide dispersal habitat in the future.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for northern goshawk, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

Treatments may reduce conifer encroachment in aspen stands. Diversity of bird and other prey species in the area are likely to change spatially within the project area as this transition occurs. Birds are a key prey item for goshawks and removal of conifers within aspen stands could reduce foraging opportunities to some degree. Removal of conifer in addition to the reintroduction of fire to the ecosystem will encourage aspen expansion and regeneration. If some snags and/or course woody debris are removed, the loss of these habitat components could also affect goshawk prey species as well to some degree. However, goshawks need a relatively open stand structure to capture prey. Reducing stand density as is proposed could increase foraging success and improve the area as suitable goshawk habitat.

Stands that are more open could also improve habitat conditions for prey species (primarily passerines) which will ultimately benefit goshawks. Disturbance and habitat protective measures listed in the design criteria above should maintain or improve species diversity and habitat conditions for goshawks. Increased human activity during the implementation of the proposed activities could displace nesting goshawks from the project area. Additional surveys will be conducted in 2007 prior to any implementation of vegetation treatments in suitable habitat. Treatments may reduce the quality of habitat in some areas over the short-term (1-10 years); however, the quality of goshawk habitat is expected to increase in the long term (10 plus years). Implementation guidelines are in place to adjust season of treatment and create protective buffer areas if goshawks are detected in the project area in the future.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing timber harvest and fire suppression has had, and likely continues to have the greatest cumulative direct and indirect cumulative effect on this species. The current mountain pine beetle outbreak and subsequent logging across the area would alter habitat composition, ultimately creating a more open forest structure. Each of these activities and actions would increase habitat fragmentation and alter suitable habitat to some degree as discussed above.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for northern goshawk, please refer to the BE/BA in Appendix B.

Northern harrier (*Circus cyaneus*)

Affected Environment

Harriers are a resident in most of Colorado during migration and summer but they are rarely found in the analysis area. They inhabit grasslands, agricultural areas, and marshes, but in fall they also range up to the alpine tundra. They have been observed at elevations ranging from approximately 3,500-13,000 ft (Kingery 1998, Andrews and Righter 1992).

No Action Alternative

Though potential habitat exists within the project area, primarily on private land, no breeding records are known to occur within the project area (Kingery 1998). Harriers require dense and abundant cover in grasslands and marshes for nesting and hunting. These conditions are limited in the area due to livestock grazing on both and forest lands and adjacent private lands. They are also limited by site potential due to limited water and riparian habitats in the area. Natural processes are unlikely to greatly influence their distribution or use of the project area.

Determination:

No impact. For a more detailed rationale of the determination for northern harrier, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

Conducting prescribed burns in meadow habitats could displace individuals if they are using the area during burning. Prescribed burns in the project area would be relatively small and similar unburned meadow habitats would remain in the vicinity. Given the small temporal and spatial impacts to potential habitats it is unlikely that the activities proposed in this alternative would have any measurable effect on harriers.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing grazing and fire suppression has had, and likely continues to have, the greatest cumulative direct and indirect cumulative effect on this species.

The current mountain pine beetle outbreak and subsequent logging across the area will alter habitat composition, ultimately creating a more open forest structure. Each of these activities and actions would increase meadow habitat and possibly shrub habitat to some degree as discussed above.

Determination:
No impact. For a more detailed rationale of the determination for northern harrier, please refer to the BE/BA in Appendix B.

Fringed myotis (*Myotis thysanodes*)

Affected Environment
Fringed myotis bat status in Colorado is poorly known and they are apparently not common in the state. Fringed myotis are gleaners, where they pick prey off the vegetation while maneuvering close to the plant canopy. They have a relatively broad diet, feeding on moths, beetles, caddis flies, ants, wasps, bees, and other insects (Fitzgerald et al. 1994, Armstrong 1972). Snags are very important for this species for roost sites. Suitable snag densities for fringed myotis bats are likely over 8 large snags per acre. Individuals utilize crevices, mines, caves, or buildings for both day and night roosts. Though there are no documented occurrences of this species within the project area; survey efforts conducted by the Colorado Division of Wildlife have been limited to mines outside of the project area. A maternity roost is known to occur in an abandoned mine near the town of Buena Vista approximately 11 miles from the project area (Navo et al. 1998).

No Action Alternative
Roost loss and habitat alteration may be the most important factors affected by declines in the extent of mature and older ponderosa pine. Under this alternative, there would be no mechanical thinning, fuels reduction or prescribed fire.

Insect infestation, in conjunction with extended drought in the area, have resulted in extensive mortality of ponderosa pine and Douglas fir in the project area and surrounding areas. As a result, potential roosting habitat has increased in the area as more snags are created. Natural processes are expected to maintain these conditions in the short term (up to 20 years) however, in the absence of natural fire, due to continued fire suppression activities, it is unlikely that these conditions would persist in the long term (over 20 years). A possible limiting factor to the use of the project area by the myotis is the proximity to open water for drinking.

Determination:
May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for fringed myotis, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

The biggest effect to this species would be the removal of snags. Snags provide roost habitat for the myotis. Cavity trees that could be used for individual roost sites are within the treatment areas however, implementation guidelines are in place to retain these trees across the landscape. While maintaining an average of 40 snags/downed logs (course woody debris) and snag recruitment trees per 5 acres may still provide some habitat for these species, it is thought that suitable snag densities are likely over 8 large snags per acre, and regular pockets with several times that density may be required (Keinath 2004). A possible limiting factor to the use of the project area by the myotis is the proximity to open water for drinking.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing and anticipated future timber harvest and fire suppression within areas of suitable habitat have the greatest cumulative effect that will directly and indirectly affect these species. In particular, habitat modification from the removal of snags, and large trees may adversely affect this species and add to the cumulative effects. Each of these activities and actions would increase habitat fragmentation and alter suitable habitat to some degree as discussed above.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for fringed myotis, please refer to the BE/BA in Appendix B.

Rocky mountain bighorn sheep (*Ovis canadensis canadensis*)

Affected Environment

Colorado is home to the largest population of the species anywhere. Bighorns typically occur in steep, high mountain terrain. In Colorado, they prefer habitat dominated by grass, low shrubs, rock cover and areas near open escape. They often retreat to rest on inaccessible cliffs. Many bands now spend all year near timberline on what used to be their traditional summer range. Bighorn are primarily grazers, feeding in meadows, open woodland, and alpine tundra. However, they will also eat forbs (herbaceous plants) in the summer and browse in the winter. Grasses eaten by bighorn include bluegrass, sedges, wheat grass, bromes and fescues. Browse includes willow, mountain mahogany, winterfat and bitter brush. Forbs include clover, cinquefoil and phlox. Important bighorn sheep winter and lambing range has been identified by Colorado Division of Wildlife biologist, Jack Vayinger (2006) to occur south of the project area.

Visibility is an important habitat variable for bighorn sheep, so much so that the structure and height of vegetation are probably more important than composition of plant species because high visibility facilitates the detection of predators. Slope steepness also appears to be a significant feature of bighorn sheep habitat. They use slopes of 36 to 80% in Colorado, while avoiding slopes less than 20%. While bighorns feed in open areas, they are rarely found more than 400 meters from escape cover, where they have an advantage over most predators. Talus slopes, rock outcrops, and cliffs provide habitat for resting, lambing, and escape cover (Beecham et al. 2007).

No Action Alternative

Mountain pine beetle activity is increasing the openness of the densely stocked stands of ponderosa pine and mixed conifer which surround the open park within the project area creating more visibility for sheep that may use these stands. Bighorn sheep are known to occur both north and south of the project area; however use within the project area is likely incidental. Opening of the forest may expand the habitat available to bighorn sheep adjacent to the project area, however slopes are relatively gentle (approximately 155 acres over 40% slope) and escape cover is limited which may limit the use of the project area by bighorn sheep regardless of natural processes effects to forest stand conditions.

Determination:

No impact. For a more detailed rationale of the determination for bighorn sheep, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

Proposed activities would increase the openness of the densely stocked stands of ponderosa pine and mixed conifer which surround the open park within the project area. Bighorn sheep are known to occur both north and south of the project area however use within the project area is likely incidental. Opening of the forest may expand the habitat available to bighorn sheep adjacent to the project area, however slopes are relatively gentle (approximately 155 acres over 40% slope) and escape cover is limited within the project area which may limit the use of the project area by bighorn sheep regardless of the resulting forest openings created by proposed activities.

Bighorn sheep are more sensitive to disturbance on their winter range when forage resources are scarce and higher demands on their metabolism are brought on by exposure to winter conditions. Increased activity by logging and hauling vehicles through winter range may negatively impact sheep through disturbance to security areas and increased stress in areas where vehicle traffic is normally lower in the winter months. Design criteria are in place to reduce disturbance to winter range by restricting logging and hauling to the northern portion of the project area during the period of December 1 through April 15. Vehicle traffic on these routes is much greater during the spring, summer and fall months due to increased forest visitor use. Logging activities which may occur during these seasons may have effects on individuals lambing by increasing disturbance caused by vehicular traffic, but the increases would be negligible.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing and anticipated future timber harvest and fire suppression within areas of suitable habitat have the greatest cumulative effect that will directly and indirectly affect this species.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for bighorn sheep, please refer to the BE/BA in Appendix B.

Townsend's big-eared bat (*Plecotus townsendii*)

Affected Environment

In Colorado, this bat inhabits the rough, "broken country" vegetation typical of brush or open woodland (Armstrong 1987) at elevations up to 9,500 ft (Fitzgerald et al. 1994). Edge habitat seems to be a preferred habitat of some big-eared bats, primarily because it may be it is easier for them to feed where there are fewer branches to avoid while pursuing prey and it is able to discriminate insects at greater distances. Big-eared bats glean insects from leaves, with a majority of their foraging occurring over water (Fitzgerald et al. 1994).

No Action Alternative

Habitat alteration may be the most important factor affected by declines in the extent of mature and older forests. Under this alternative, there would be no mechanical thinning, fuels reduction or prescribed fire. Insect infestation, in conjunction with extended drought in the area, have resulted in extensive mortality of ponderosa pine and Douglas fir in the project area and surrounding areas. As a result, potential foraging habitat has been affected in the area as canopy cover has been reduced and regeneration is occurring. Natural processes may reduce the quality of potential foraging habitat as canopy cover is reduced in the short term (up to 20 years) but, may provide more quality foraging habitat in the future. A possible limiting factor to the use of the project area by the Townsend's big-eared bat is the proximity to open water and roost sites.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for Townsend's big-eared bat, please refer to the BE/BA in Appendix B.

Proposed Action Alternative

The biggest effect to this species would be the opening of the canopy. Salvage, thinning and prescribed burning treatments would reduce canopy cover and encourage regeneration in forested stands, thus reducing potential foraging habitat quality until these stands again reach mature and older stages. A possible limiting factor to the use of the project area by the Townsend's big-eared bat is the proximity to open water for drinking; and roost locations. No known caves, abandoned mine tunnels or abandoned buildings that could be used for communal or maternity roost sites would be affected by the proposed treatments.

Cumulative Effects

Refer to the Herring Park BE (Appendix B) for a detailed list of additional cumulative effects discussion (section 8.0) for specific activities and further detail on potential adverse cumulative effects to this species. Specifically, of the ongoing and anticipated future timber harvest within areas of suitable habitat have the greatest cumulative effect that will directly and indirectly affect these species. In particular, habitat modification from the removal of snags and large trees may adversely affect these species and add to the cumulative effects. Each of these activities and actions would increase habitat fragmentation and alter suitable habitat to some degree as discussed above.

Determination:
May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing. For a more detailed rationale of the determination for Townsend's big-eared bat, please refer to the BE/BA in Appendix B.

Botany Special Status Species

The Biological Evaluation (BE) for this project is included in Appendices B. This document includes more detailed analysis of special status species within the project area. The following sections summarize the analyses of the BE.

The purposes of this Biological Assessment and Biological Evaluation are to identify known locations of federally endangered, threatened or proposed species, and Regional Forester Sensitive Species plants (RFSS) and their habitats within or near the project area; to document analyses of the potential effects of the proposed project on federally listed threatened, endangered, and proposed plant species, and RFSS; and to ensure that endangered, threatened, proposed, and RFSS receive full consideration in the decision making process. Activities considered in this action require a biological evaluation to be completed (FSM 2672.4). The intent of this biological evaluation process is to conduct and document activities necessary to ensure that proposed management actions would:

1) not jeopardize species listed, or proposed to be listed, as endangered or threatened and designated or proposed critical habitat pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended; and

2) ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native species or cause Regional Forester Sensitive Species to trend toward federal listing (FSM 2672.41).

Affected Environment

Montane grasslands cover about 2,700 acres of the NFS land within the proposed project area. Dominant grasses include prairie Junegrass (*Koeleria macrantha*) and squirreltail (*Elymus elymoides*). Prairie sagewort (*Artemisia frigida*) is the most abundant shrub of these meadows. The most conspicuous forbs are Colorado rubberweed (*Hymenoxys richardsonii*), wholeleaf Indian paintbrush (*Castilleja integra*), and Fremont's geranium (*Geranium caespitosum*). Other frequently observed forbs include Fendler sandwort (*Arenaria fendleri*), wavyleaf thistle (*Cirsium undulatum*), and sidebells penstemon (*Penstemon secundiflorum*). Rocky Mountain Indian parsley (*Aletes anisatus*) has been found at one site in the area. Montane grasslands merge into aspen and ponderosa pine woodlands with little change in species composition.

Douglas-fir and Ponderosa pine forest and woodlands likewise have a flora similar to that of the montane grasslands, and become more mesic as the canopy closes. The canopies of many stands in this area are very open because of a mountain pine beetle epidemic. In these areas, canopy closure may be as low as 5 to 10 percent. The understory vegetation becomes rather diverse with the increased sunlight. Arizona fescue dominates the ground cover, and prairie Junegrass and squirreltail are common. Forbs of these areas in addition to those in the other open parts of the project area include Fendler's ragwort (*Packera fendleri*), scarlet gilia (*Ipomopisis aggregata*), pussytoes (*Antennaria* spp.), white locoweed (*Oxytropis sericea*), and nodding onion (*Allium cernuum*).

Quaking aspen is common in these stands. Of some concern in these areas is the presence of hound's tongue (*Cynoglossum officinale*) and Canada thistle (*Cirsium arvense*). In areas without beetle-killed trees, herbaceous density is lower, but most of the same species are present.

Prefield Review

The Regional Forester has identified sensitive species for Region 2, and the Pike and San Isabel National Forests, and Cimarron and Comanche National Grasslands (PSICC) has further refined this list, to include only those species with the potential to occur within its administrative boundaries. The threatened, endangered, and RFSS list for the PSICC was used to identify those species that could occur in the project area. Based on that document and research of other records (e.g., Colorado Natural Heritage Program 2005), it was determined that the habitat in the project area could be suitable for two of the species identified in Table 1.

Only the species that may occur or have habitat that could be affected by the project will be carried forward in the analysis. Other species are excluded from detailed analysis because this project is outside their distributional range, the area does not have habitat for them, the action alternatives will not affect the species or its habitat, or other reasons stated in Table 3.6.7.

Table 3.6.7 Federally listed and Regional Forester Sensitive Species plants.

Scientific name Common name	Habitat	Status	Species present?	Habitat present?	Rationale for not carrying forward in analysis
Aquilegia chrysantha var. *rydbergii* Rydberg's golden columbine	Montane, subalpine; rocky ravines near streams; 6000-8000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Armeria maritima ssp. *siberica* Siberian sea thrift	Alpine; tundra, grassy slopes; 11900-13000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Astragalus leptaleus Park milkvetch	Montane; sedge meadows, grassy streambanks; 7500-10000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Botrychium lineare **Narrowleaf grapefern**	**Montane, subalpine; grass/forb meadows, sagebrush, cirqueland; 7900-11000 ft.**	**Federal candidate; RFSS**	**No**	**Yes**	
Braya glabella Smooth northern-rockcress	Alpine; scree slopes; 12000-13000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area

Scientific name Common name	**Habitat**	**Status**	**Species present?**	**Habitat present?**	**Rationale for not carrying forward in analysis**
Carex diandra Lesser panicled sedge	Montane, subalpine; willow carrs, fens, wet meadows; 9000-11000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Carex livida Livid sedge	Montane, subalpine; hummocks in rich fens; 9000-10000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Cypripedium parviflorum Lesser yellow-lady's-slipper	Montane, subalpine; moist forest, aspen groves; 7400-8500 ft.	RFSS	No	No	Outside elevational range; no habitat in project area
Draba exunguiculata Garys Peak draba	Alpine; talus slopes, fell fields; 11500-14000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Draba grayana Gray's draba	Alpine, subalpine; tundra, gravelly slopes; 11000-14000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Draba smithii Smith's draba	Montane, subalpine; canyons, talus slopes; 7700-13100 ft.	RFSS	No	No	Not in Northern Parks and Ranges ecoregion; no habitat in project area
Drosera rotundifolia Roundleaf sundew	Subalpine; peatmats, fens; 9100-9800 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Epipactis gigantea Stream orchid	Wetlands; open, early successional areas; 4800-8000 ft.	RFSS	No	No	Outside elevational range; no habitat in project area
Eriogonum brandegeei Brandegee's buckwheat	Pinyon-juniper; open sagebrush; 5700-7600 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Eriophorum altaicum var. *neogaeum* Whitebristle cottongrass	Alpine; fens, marshes; 9500-14000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Eriophorum chamissonis Chamisso's cottongrass	Alpine; fens, marshes; 9500-14000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area

Scientific name Common name	Habitat	Status	Species present?	Habitat present?	Rationale for not carrying forward in analysis
Eriophorum gracile Slender cottongrass	Montane, subalpine; fens, wet meadows; 8100-12000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Eutrema penlandii Penland's eutrema	Alpine; saturated meltwater areas; 12000-13100 ft.	Federally listed, threatened	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Festuca campestris Rough fescue	Subalpine; meadows; 11000 ft.	RFSS	No	No	Not in Northern Parks and Ranges ecoregion
Festuca hallii Plains rough fescue	Alpine, subalpine; tundra, dry grasslands; 11000-12000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Ipomopsis globularis Hoosier Pass ipomopsis	Alpine, exposed ridges, gravelly slopes; 11500-14000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Kobresia simpliciuscula Simple bog sedge	Alpine; glacial outwash, fens, moist gravelly tundra; 9600-12800 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
***Machaeranthera coloradoensis* Colorado tansyaster**	**Alpine, subalpine; parks, scree slopes, dry tundra; 7600-13000 ft.**	**RFSS**	**No**	**Yes**	
Malaxis brachypoda White adder's-mouth orchid	Foothills, montane; in mosses along streams; 7200-8000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Mimulus gemmiparus Rocky Mountain monkeyflower	Subalpine, montane; seepages, wet banks; 8400-11120 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Neoparrya lithophila Bill's neoparrya	Pinyon-juniper; xeric woodlands, cliffs; 7000-10000 ft.	RFSS	No	No	Not in Northern Parks and Ranges ecoregion
Oreoxis humilis Rocky Mountain alpineparsley	Alpine drainage ways; 12000-13000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Parnassia kotzebuei Kotzebue's grass of Parnassus	Alpine, subalpine; wet rocky areas, moss mats; 10000-12500 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area

Scientific name Common name	Habitat	Status	Species present?	Habitat present?	Rationale for not carrying forward in analysis
Penstemon degeneri Degener's beardtongue	Subalpine, montane; meadows, pinyon-juniper woodlands; 6000-9500 ft.	RFSS	No	No	Not in Northern Parks and Ranges ecoregion
Potentilla rupincola Rock cinquefoil	Subalpine, montane; granitic outcrops, low tundra; 6500-11000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Primula egaliksensis Greenland primrose	Montane; wet meadows, willow carrs, fens; 9000-10000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Ptilagrostis porteri Porter's false needlegrass	Subalpine, alpine; willow carrs, hummocks; 9200-12000 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Ranunculus karelinii Ice cold buttercup	Alpine; scree slopes, dry rocky areas; 12000-14100 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; outside elevational range; no habitat in project area
Rubus arcticus ssp. *acaulis* Dwarf raspberry	Wetlands; willow carrs, mossy streamsides; 8600-9700 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Salix arizonica Arizona willow	Subalpine; wet meadows, seeps, streams; 8300-10800 ft.	RFSS	No	No	Not in Northern Parks and Ranges ecoregion
Salix candida Sageleaf willow	Foothills, montane; rich fens, pond edges; 8800-10600 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Salix myrtillifolia var. *myrtillifolia* Blueberry willow	Foothills to alpine; fens, streambanks; 9300 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Salix serissima Autumn willow	Montane; calcareous fens, marshes; 7800-9300 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area
Spiranthes diluvialis Diluvium ladies' tresses	Wet meadows along streams, springs, seeps; below 6500 ft.	Federally listed, threatened	No	No	Not in Northern Parks and Ranges ecoregion
Viola selkirkii Selkirk's violet	Montane, subalpine; cold mountain forests; 8500-9100 ft.	RFSS	No	No	Not in Northern Arkansas Granitics-39 mile Mountain subregion; no habitat in project area

Field Reconnaissance

The proposed project area was visited on 20 June 2006 by Steven Olson, Forest botanist. It was also visited on several occasions by Janet Prevey and Mike Kirkpatrick.

Consultation History

The USDI Fish and Wildlife Service has identified two federally listed species as having part of their range on the Pike and San Isabel National Forests. These species are the threatened Penland alpine fen mustard (*Eutrema penlandii*) and the threatened Diluvium ladies' tresses (*Spiranthes diluvialis*). There are no documented occurrences of, nor habitat for, Penland alpine fen mustard or diluvium ladies' tresses within the proposed project area, so the proposed project will have no effect on this species. As a result, consultation with US Fish and Wildlife Service was not required.

Determination

Because there are no known occurrences of, and no habitat for, Penland alpine fen mustard or diluvium ladies' tresses in or near the project area, the proposed project will have no effect (direct, indirect, or cumulative) on these species.

Analysis Of Effects – Regional Forester Sensitive Species

Two species on the RFSS list have potential to occur within the proposed project area, but they have not been documented as occurring there. Other species on the RFSS list were not considered because of the project area is outside the known range of the species, there is no appropriate habitat in the project area, or for other reasons stated in Table 3.6.7.

Affected Environment

Narrowleaf grapefern (Botrychium lineare W.H. Wagner) is a perennial herb in the adder's-tongue fern family (Ophioglossaceae). Spores are produced in June and July (Spackman et al. 1997). Narrowleaf grapefern is found in deep grass and forb meadows, sagebrush, cirqueland, and potentially other habitats. Locally, it occurs in coarse, decomposed granite. This species is found at elevations ranging from 7,900 to 11,000 feet (Beatty et al. 2003).

Known sites for narrowleaf grapefern are within the Northern Parks and Ranges in the Pikes Peak-Rampart Range and Mosquito-Gore Range (McNab et al. 2005), but habitat may be present in the project area. Narrowleaf grapefern is ranked G1 by NatureServe (2005). It is tracked by the Colorado Natural Heritage Program and is ranked S1. It is a candidate for federal listing as an endangered or threatened species (65 FR 30048-30050). Narrowleaf grapefern is small and easily over-looked, and may not be present every year.

Colorado tansyaster [Machaeranthera coloradoensis (Gray) Osterhout] is a low-growing shrub or perennial herb in the aster family (Asteraceae). It flowers from July to mid August, and fruits during August (Beatty et al. 2004). Colorado tansyaster may be found in sparsely vegetated gravelly places in subalpine mountain parks, plains/park grassland, in dry ponderosa pine grasslands. Slopes are less than 35 percent. Sites for Colorado tansyaster have been found on soils developed in colluvium. Bedrock where Colorado tansyaster has been found is sedimentary, volcanic, or granitic (Beatty et al. 2004).

This species has been observed on the Leadville limestone, Manitou limestone, Minturn and Belden formations, and Laramide intrusive rocks. It has been found at elevations ranging from 7,600 to 13,000 feet (Beatty et al. 2004). There is a known site of Colorado tansyaster within the Northern Arkansas Granitics-39 Mile Mountain ecoregion within one mile of the project area. Colorado tansyaster is ranked G2 by NatureServe (2005). It is tracked by the Colorado Natural Heritage Program and is ranked S2.

No Action Alternative

With no action, the potential for large stand-replacing wildfires would remain. These stand-replacing wildfires would provide the conditions for removal of associated herbs, shrubs and trees, opening the door for invasive plant species. Stand-replacing wildfires may cause greater impacts to plant species since these fires may kill the seedbank and sterilize the soil.

The direct effect of wildfire is the potential scorching or mortality of individuals or populations from fire or heat. Wildfire can indirectly impact plants by causing changes in vegetation composition and successional pathways of that vegetation, changing local hydrologic patterns in sensitive plant habitat, changing the fire regime or by changing the soil characteristics of the habitat. Wildfire can also lead to changes in forage condition, and this can lead to changes in the foraging behavior of livestock and wildlife within the area. Indirect effects can also occur from noxious weed invasion or from impacts to pollinators or mycorrhizae associated with sensitive plant species.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing.

Proposed Action Alternative

Activities associated with the proposed project that are likely to have impacts to plants and habitat include mechanical treatments, and prescribed fire. Factors affecting plants include soil disturbance, compaction, prescribed fire, and invasive plant species.

The effect of prescribe fire on narrowleaf grapefern is complex. Prescribe fire may be detrimental to the species because: 1) fire will scorch leaf tissue and may reduce or eliminate reproduction in populations exposed to fire. Removal of leaf tissue does not appear to kill the affected individual which will resprout in the following years from a perennial bulb; 2) weed infestation following fire can directly compete with narrowleaf grapefern for light, water, and nutrients.

Conversely, fire may be beneficial to narrowleaf grapefern because: 1) fire creates a more open canopy, preserving and creating habitat for this early to mid-seral species; and 2) growth of narrowleaf grapefern and its mycorrhizal associates may be stimulated by nutrient release after fire. Fire intensity is important in determining whether the underground organs will survive. Seasonality of the burn is also important. Spring burns occur while the aboveground leaf tissue is actively growing and before reproduction has taken place. Fall burns occur after spores have been released. Therefore, spring burns may cause more impact to a population than fall burns. Weed infestation following a burn has the potential to extirpate a population. Narrowleaf grapefern and invasive species share an affinity for open sites, making weed invasion a serious concern.

Colorado tansyaster grows in a variety of habitats from the foothills to alpine. The effects of fire on the species can be expected to differ in such a diversity of habitats, but no research has been performed on the response of the species to fire. Colorado tansyaster is a deep-rooted perennial species that grows in open areas with little or no overstory. Fire may play a role in maintaining the open sites apparently required by the species. Occupied sites may have low fuel loading and not be subject to high-intensity burns. As a deep-rooted perennial, individuals may be able to survive lower intensity burns. Since the species occupies open sites, often with bare soil, it may be a poor competitor. Fire may remove competing vegetation, or may open the site up to invasion by weeds.

Soil disturbance, compaction from heavy machinery can impact the species directly by crushing and trammpeling. Indirectly these changes may result from shifts in the hydrologic, solar, and soil characteristics of the habitat. Design criteria is in place to avoid soil disturbing activities during periods of wet soils.

Noxious weed invasion potentially poses a negative impact to all plant habitats, although different habitats may be invaded by different species of noxious weeds. These potential effects result from removal of vegetation and opening up the area to additional light. Canada thistle (Cirsium arvense) may invade with potentially catastrophic results. These noxious weeds can lead to habitat changes that are detrimental to threatened, endangered plant species. Noxious weeds, once established, could indirectly impact sensitive plant species through allelopathy (the production and release of plant compounds that inhibit the growth of other plants), changing the fire regime, or direct competition for nutrients, light, or water. Subsequent weed control efforts such as hand-pulling, hoeing, mowing, or herbicide application could also negatively impact sensitive plants. Design criteria has been developed to reduce risk of spreading noxious weeds. Treatment areas would be monitored pre and post treatment for noxious weeds.

Cumulative Effects

There will be continued maintenance of existing Forest roads and trails in the vicinity of the project area. Other roads will be maintained by the state, county, and by private individuals. Development will continue to occur on private land in the area. Concurrent with these will be the likely increase in traffic on roads in the vicinity. Dispersed recreation use will also continue on NFS lands. Past and current activities have altered plant occurrences and their habitats. These activities have the potential to cumulatively affect plants and include: historic grazing, timber harvest and thinning, fire suppression, prescribed fire, mining, motorized and non-motorized recreational use, road and trail construction, urban development, and noxious weed infestation.

Determination:

May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federally listing.

3.7. Heritage Resources

Management Direction

Cultural (archaeological and historical) resources are irreplaceable and nonrenewable. All recorded cultural properties are evaluated for significance and listing on the National Register of Historic Places (NRHP). Sites determined eligible are avoided by all project activities that might have the potential to affect the property in an adverse manner. In the event that this is not possible, mitigating treatments for eligible sites are developed on a case-by-case basis as warranted and implemented as needed. The forest's heritage resources management staff in consultation with unit managers, the Colorado Office of Archeology and Historic Preservation and the Advisory Council on Historic Preservation, are responsible for decisions about significance and appropriate protection.

Access to sites for public education and enjoyment are considered on a case-by-case basis in keeping with the National Historic Preservation Act and derivative Forest Service and BLM policy direction; unit managers insure such sites are appropriately protected against theft, vandalism, or loss. Significant archaeological sites are preserved for scientific investigation or appropriate public use. Cultural resources are part of the recreation opportunities spectrum and are available for visitors, with appropriate safeguards. Some considerations for site protection are:

1. Erosion of archaeological deposits at significant sites is minimal and controlled when discovered.

2. Agency improvements and projects are designed so that they do not affect important resources.

3. Partnerships with universities and other scientific institutions are encouraged to investigate the archaeology on public lands.

4. Historic mining and town sites are protected from impacts and are available for visitors.

5. Prehistoric sites are available for visitors and for scientific study with appropriate protective safeguards. Vulnerable sites in terms of possible pilferage or traditional values to Native American groups are protected and not available for visitors.

6. A record of the mining era and important mountain homestead sites are preserved and protected from erosion and impacts.

Affected Environment

By the end of 2006, the San Isabel National Forest had conducted six cultural resource inventories in the Herring Park project area. As a result of these investigations forty-three historic properties (termed "prehistoric sites" or "historic sites") have been identified and recorded. Sixteen of these sites are affiliated with historic use and the other twenty-seven are prehistoric in their cultural affiliation.

Fourteen of the sixteen recorded historic sites are related to mineral exploration and exploitation in this part of the San Isabel National Forest. These mining sites are specifically associated with the Colorado High Country Mining Boom of the late 19th and early 20th century; local flurries of mining activity in the Upper Arkansas River valley and the surrounding mountain areas were based on the discoveries of promising ore deposits and their exploration. These local boomlets were quite limited in a geographic sense; as one area "hit it rich", there would be a short period of expansion and frenzied activity followed by a contraction as the local lodes played out and another strike was made somewhere else. Mining-related sites in the Herring Park include prospecting complexes and lode mines/mining camps; there are four of the former which consist of grouping of shallow mining explorations.

There are nine actual mines and mining camps which often contain domestic refuse, waste rock dumps and areas of construction material reflecting the locations of former structures. One mining site is a "dugout" or temporary dwelling built into a prospecting pit. The Herring Park mining sites reflect about sixty years of mining activities, from 1880 to 1940. One other historic site is a record of the federal government public works projects implemented to alleviate the Great Depression of the 1930s; this site is a series of check dams or "gulley stoppers" in an intermittent drainage. The check dams reflect a more comprehensive Civilian Conservation Corps (CCC) reclamation project to arrest erosion in the Herring Park area. The last historic site is an abandoned sawmill with a collapsed saw set, former structure locations and domestic refuse; the sawmill used steam as a power source and apparently dates to the late 19th century.

The twenty-seven recorded prehistoric sites are generally characterized as surface areas of stone tools, and stone tool manufacturing debris. One culturally modified ponderosa pine was identified adjacent to the project area. Concentrations of finished tools and manufacturing debris were noted at some of the sites; these may represent the remnants of temporary dwellings, or outside activity areas. Total quantities of material items on the surfaces of these sites generally range from less than ten to several hundred artifacts. Prehistoric sites with relatively few surface items and with no discernable concentrations are usually interpreted as resource procurement and processing areas; sites with relatively many surface items (50 or more) and noticable concentrations of surface material are thought to be seasonal camps.

Thus, the prehistoric sites recorded in the Herring Park vicinity probably are either locations where small prehistoric social groups processed harvested resources or camps where they resided during the spring, summer and fall seasons. Based on the raw materials and tool types represented in the surface materials assemblage variation and estimations of soil and artifact movements, most prehistoric sites identified in the Herring Park area date from the Middle Ceramic Period to the Historic Contact Period (A.D. 1000-1870); the area probably was inhabited during earlier periods, but the evidence for such use has been obscured or destroyed by later human use and geological forces.

Eighteen of the forty-three recorded historic and prehistoric sites (one historic and seventeen prehistoric) are eligible or potentially eligible for listing in the National Register of Historic Places. The eligible historic site is the abandoned sawmill which contains substantial archeological information regarding the operation and use of 19th century mountain sawmills. The eligible prehistoric sites contain substantial intact archeological deposits that are a potentially wealthy source of various kinds of information.

This information is useful in the context of research problems in Colorado Mountain prehistory; for example, the information could be used to calculate the time span of prehistoric occupation in the southern Rocky Mountains, or for reconstructing the subsistence patterns and other lifeways of indigent social groups. Some of the prehistoric sites may be important to the modern descendants of the American Indians peoples who previously inhabited the area.

Environmental Consequences

No Action Alternative

There would be no direct effects to cultural resources. There are possible indirect effects. No action would increase the amount of dead wood, which would increase the frequency and severity of uncontrolled wildfires; such fires could damage structures and flammable materials in archeological deposits at historic sites. High intensity fires could also damage artifacts on the surface of prehistoric sites (if they were directly exposed to flame or high temperatures). Also, wildfire would destroy standing trees and surface vegetation increasing erosion and related movement or loss of archaeological materials and contexts.

Cumulative Effects

There should be no cumulative effects resulting from implementation of the No Action Alternative combined with the implementation of other potential public land management activities in the near future. Presumably, potential future actions will trigger the required National Historic Preservation Act studies that include assessments of possible impacts on any identified cultural sites and recommendations for avoidance or mitigation of such impacts.

Proposed Action Alternative

If this alternative is implemented according to the identified prescriptions, there will be no direct effects to cultural resources. Every significant (eligible or potentially eligible) site will be avoided during project implementation. For defined burn units, mechanical treatment units, and reseeding areas, the perimeters of these sites will be flagged so that the interiors are safe from vehicles, heavy equipment, and all ground-disturbing activities. Also, staging and equipment/vehicle holding areas and administrative areas will be located so as to avoid cultural sites.

The indirect effects of project implementation should be generally beneficial; there would be a reduction in the frequency and intensity of wildfire. The curtailment of the fire danger would mean less related fire impacts – there would be less fire-related loss of archeological deposits and materials, and less indirect loss resulting from water and wind erosion.

Cumulative Effects

Cumulative effect would also be positive, in that the positive effects realized through implementation of the treatments contained in this alternative would not be negated by the additional actions of local projects in the near future. Vegetation would periodically have to be thinned to insure adequate site protection standards are maintained.

3.8. Visual Resources

Management Direction

The Forest Plan establishes Visual Quality Objectives (VQO) for each designated MA. Management Areas for Aspen Management (4D) and Livestock Grazing (6B) require that a VQO of no less than modification must be achieved. For these MAs, the visual directive is that activities related to tree stands, grass, forbs and browse must be designed and implemented to blend in with the natural landscape.

Visual Absorption Capacity (VAC) is used to estimate the relative ability of the landscape to accept and recover from manipulation. The high presence of aspen, diverse canopy species composition and rolling topography typically produces a high VAC on most east, west, and north slopes within the project area. On drier, rockier, south-facing slopes with sparse tree cover, the VAC is lower.

Affected Environment

The elevation within the project area ranges from 9,000 to 9,800 feet, and the high elevation limits the types of vegetation communities present. The project area covers a variety of scenic landscapes due to the mix of vegetation species and communities, topography ranging from flat to rolling to mountainous, rock outcroppings, and the presence of dry ephemeral drainages. The appearance of the various vegetative communities along the visible slopes is very much a mosaic of mature ponderosa pine, mixed conifers such as Douglas-fir and Englemann spruce, young regenerating aspen groves and treeless patches. Due to their red-brown cast, diseased and dead standing trees are evident along ridgelines, sideslopes, and in the foothills at lower elevations.

The majority of all treatment areas in the foreground (within ¼ mile) and two-thirds of treatment areas in the middleground (¼ mile to 4 miles) are visible from CR 187 and CR 174B through Herring Park. No treatment areas occur in the background (beyond 4 miles) from these corridors. Traffic counts are not available for CR 187 and 174B. Other viewing locations are confined to USFS system roads, FDR 84, FDR 86, FDR 174A, FDR 174B, FDR 174C, FDR 175, FDR 186, and FDR 186B. However, these roads and trails are often closed for six months or more due to weather conditions.

From these primary travel corridors, the foreground scenery is typically grassland in the lower elevations along the eastern project boundaries (although they can occur at any elevation) and shrubland in the mid elevations. Landform is typically flat to somewhat rolling, and the texture ranges from very fine (grasslands) to very coarse. Shrublands contain a combination of low shrubs (predominately sagebrush), grasses, bare red mineral soil and rocks, and exhibit a range of colors from grey-green to reddish to dark green (when conifers are present). Grasslands are more uniform and are usually tan to yellow-green in color. Lines are not always obvious, but when present are generally noted in the landscape as the sharp divide between conifer forest and grassland, and in some cases rolling ridgetops. Erosion from water flow has created small gullies at the foot of these steeper dry hills. Most foreground areas are uniformly shrubland or grassland, but some have conifers scattered sparsely throughout. The impression is mainly one of openness.

The middleground scenery is somewhat more uniform. It is typically dominated by dark green ponderosa pine stands broken up by occasional aspen regeneration, which exhibits a striking color contrast in the fall. Lines in this landscape are predominately along the numerous

ridgelines of the rolling foothills. Vegetation on the north-facing slopes consists mainly of ponderosa pine, Douglas-fir, Englemann spruce and aspen with occasional standing dead trees, but on the drier, south-facing slopes ponderosa pine and low shrubs are dominant with a background of rock and bare reddish mineral soils. There are also some areas of moderate-elevation, smoothly-rolling grassy ridgetops. The landform is generally rolling with occasional steeper slopes. The texture is less coarse overall due both to the distance and to the increased uniformity of vegetation on the north-facing slopes. Many foreground ridges completely obscure the remaining middleground and background, leaving little dominance to scenery from a given viewpoint but more of a sense of enclosure or limited view.

Environmental Consequences

No Action Alternative

Under this alternative, an elevated risk of negative effects to visual resources due to pine beetle infestation and high-intensity wildfires would continue. Visual quality would be maintained in the short-term, but may deteriorate in the long term. If treatments are not implemented, a decline in forest health would increase the risk of large-scale wildfires that could result in direct negative effects to visual quality of the area.

Escalating beetle-infestations and the resulting discoloration and amount of dead and downed trees could cause a long-term decline in visual quality. VQOs would most likely continue to be met in the study area, although the deteriorating condition of the vegetation may not meet Partial Retention in 7B. In the event of a large-scale wildfire or tree kill, scenic quality would cumulatively decrease and VQOs for the affected area may not be met.

Proposed Action Alternative

The alternative proposes to implement a combination of mechanical treatment, followed by slash treatment, and broadcast burning to reduce the spread of MPB and also reduce the potential for crown or other catastrophic fires. The treatment would also include salvaging insect-killed trees.

The construction of temporary roads to access treatment units would be required, and skid roads and log landings would result from mechanical treatments, creating visual contrasts. These roads would be obliterated within one year of harvest, and all temporary roads and non-system roads would be effectively closed after all operations are completed.

Areas treated through mechanical treatment and broadcast burning would appear natural after one growing season once slash piles are disposed of. The resulting vegetation would contain more open, park-like environments with increased ecological diversity and visual interest. By opening up stands mechanically and through burning, aspen would be rejuvenated resulting in greater color, form, and seasonal change. Established VQOs would be met one growing season following treatments.

Cumulative Effects

Considering all cumulative effects to visual resources, including past, current, and reasonably foreseeable activities, the proposed action would improve the visual quality of the study area in the long term. Treatments would reduce the potential for catastrophic wildfire, which could cause considerably greater disruption to recreational opportunities.

3.9. Recreation

Management Direction

The Forest Plan establishes Recreation Opportunity Spectrum (ROS) objectives. Most of the study area lies in a semi-primitive motorized ROS, with some semi-primitive non-motorized ROS and roaded natural ROS along Level 3 roads.

Affected Environment

The study area is highly used for dispersed uses from early June to late September and on weekends, with low to moderate use for the remainder of the open season, with limited access to most roads in the winter due to snow. In the summer and fall, scenic driving, off-road driving, day hiking, backpacking, and mountain biking (on roads and two-tracks) are primary recreational activities, with hunting being a primary activity during big game rifle seasons. Secondary activities are horseback riding, camping, and shooting. The study area experiences low levels of cross county skiing, and snowshoeing along the road system during the winter months.

Visitors have expressed high levels of concern for aesthetics and recreation, as evidenced by the Forest Service National Visitor Use Monitoring Results for the Pike-San Isabel National Forest and Comanche and Cimarron National Grasslands (2002). Scenery and forest landscape attractiveness were rated as important to very important to day use site users, and recreation visitors. According to this study, two of the top primary activities for all Forest visitors were "driving for pleasure" and "viewing natural features such as scenery and wildlife."

Environmental Consequences

No Action Alternative

Under this alternative, an elevated risk of negative effects to recreation opportunities due to pine beetle infestation and high-intensity wildfires would continue. Recreation opportunities would be maintained in the short-term, but may deteriorate in the long term. If treatments are not implemented, a decline in forest health would increase the risk of large-scale wildfires that could result in direct negative effects to recreational use.

Proposed Action Alternative

The alternative proposes to implement a combination of mechanical treatment, followed by slash treatment, and broadcast burning to reduce the spread of MPB and also reduce the potential for crown or other catastrophic fires. The treatment would also include salvaging insect-killed trees. These treatments would affect recreational opportunities by limiting access to destinations and altering the physical setting of the Forest in the short-term. Impacts would be minimized by implementation of treatments during late fall and winter months when recreational use is at lower levels.

Potential short-term effects include noise, smoke, black scorch, visual activity, and slash piles. Most USFS system roads travel through treatment areas. Some USFS roads would be closed during treatments, resulting in the short-term displacement of users and dispersed activities such as backpacking and mountain biking would be directly affected during treatments. Prescribed burns adjacent to these dispersed recreation sites and roads would be of low intensity to protect visual qualities and recreational facilities.

Grasslands are adjacent to the roadways in most of these highly visible Treatments Units, and the mosaic nature of the existing vegetation will limit direct effects to sightseers traveling these primary corridors. Noise, dust, and other impacts from management activities would be noticed by other users of this area. Although these effects would be short-term and minor, users may chose to avoid the treatment units and adjacent areas until activities have been completed. Due to the high weekend recreational use, commercial hauling and commercial logging will not occur on weekends.

Areas treated through mechanical treatment and broadcast burning would appear natural after one growing season once slash piles are disposed of. Recreationists could access the resources directly following treatments.

Cumulative Effects

Considering all cumulative effects to recreation, including past, current, and reasonably foreseeable activities, the proposed action would improve and maintain a high level of recreational experiences in the long term, although short-term impacts may cause some recreationists to avoid treatment areas while management activity is occurring. Treatments would reduce the potential for catastrophic wildfire, which could cause considerably greater disruption to recreational opportunities.

3.10. Range

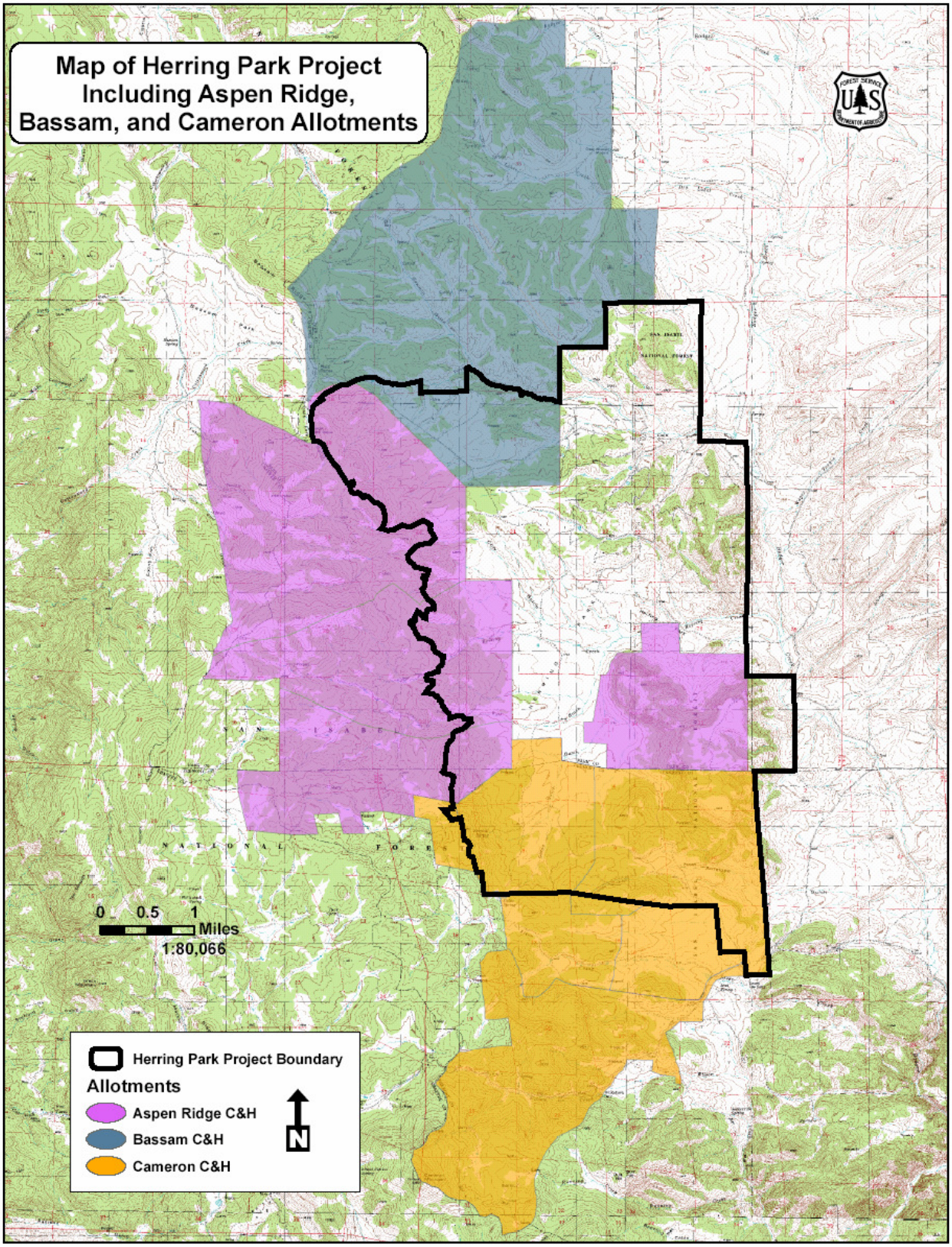
Affected Environment

There are a portion of three grazing allotments within the Herring Park analysis area: Aspen Ridge, Bassam and Cameron (map no. 1).

The ***Aspen Ridge Allotment*** currently has 241 cow/calf units permitted for a 3 ½ month grazing season (June 15- September 30 annually). An additional 14 cow/calf pairs are permitted on a Private land permit for the Herring Park pasture and private lands in Herring Park. The majority of the available and suitable forage is located in the bottom lands and riparian areas on the private lands in Herring Park and the bottom lands in Herring, Bull, Cow and Calf Gulches. National Forest lands borders this private property on both the south and west sides of Herring Park. This land provides the upland forage. For the past 5 years, this allotment has experienced drought conditions. As a result, the permittee has reduced his stocking levels. This year, 2006, full numbers are being stocked. The Herring Park pasture and only the eastern third of Cow Gulch, Bull Gulch and Calf Gulch pastures are within the Herring Park project area.

Eastern portion of Bull Gulch pasture. Looking south from Bull Gulch towards Calf Gulch. Heavy mountain pine beetle mortality in the Ponderosa pines on National Forest land. (October 2005)

The majority of the National Forest lands within the Aspen Ridge allotment is forested with upland grass communities. Tree species include Ponderosa pine, Douglas-fir and Aspen. These forest stands are mature and have recently been infected with mountain pine beetles. High mortality has occurred throughout these stands, especially in the ponderosa pine and Douglas-fir.


Map of Herring Park Project
Including Aspen Ridge,
Bassam, and Cameron Allotments
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Miles
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Herring Park Project Boundary
Allotments
Aspen Ridge C&H
Bassam C&H
Cameron C&H
N

Grazing within the allotment has been primarily in the bottom land and riparian areas of Herring Park, Bull Gulch, Calf and Cow Gulch. This is also where the available water sources are located for the cattle to drink. The forested and uplands area have had much less use and utilization of the grass resources. This is because of the lack of water sources. The Salida Ranger District is currently completing an environmental analysis (EA) for the Range Allotment Management Plan (RAMPs) for this allotment.

The following describes the existing condition of the Aspen Ridge Allotment as developed through the environmental analysis (EA) currently being done for the RAMP process on this allotment:

Grassland - Good species diversity present in grasses and forbs, with a mosaic of vegetative structure. Upland grasses decadent and underused. Decadent grasses increase with distance from riparian. High incidence of bare ground and litter. Noxious weeds present in limited areas (Canada thistle, shepherd's purse). Drought stress evident. Fair condition.

Stream/Riparian - High incidence of streambank trampling, pedestalling and areas of active headcutting. Riparian and upland graminoids present, but decreasing with a high incidence of forbs and Kentucky bluegrass. Lack of willow vegetation. Drought stress evident. Noxious weeds present in limited areas (Canada thistle). High incidence of bare ground. Fair-poor condition.

Mesic Meadow - Riparian and upland graminoids present, but need to expand extent of wetted soils. Areas of pedestalling. Drought stress evident. Fair-poor condition.

Bench/Transition areas - Plant loss evident on perennial grasses due to drought. Evidence of species shift from bunchgrass to forb species. Fringed sage has encroached in some areas. Canada thistle present in some areas. Some benches early to mid-seral with high incidence of forbs. High incidence of bare ground. Fair-poor condition.

Upland Shrub – Limited in extent. Good growth and regeneration of upland shrub species. Native grasses and forbs interspersed. Good condition.

Aspen - Understory of down logs, forbs and grasses present, a mosaic of understory grasses vary from vigorous to decadent. Evidence of disease and die-off of aspen in some areas. Fair-good condition.

Ponderosa Pine/Mixed Conifer Forest – Ponderosa pine largely infested by mountain pine beetle. Trees dense and drought stressed. Up to 60% of this community is dead or dying. Bunchgrass understory is increasing under dead stands. Tree litter is excessive. Mixed conifer stands are mature, some evidence of mortality. Fair condition.

The ***Bassam Allotment*** currently has 270 cow/calf units permitted for a 5 month grazing season (June 1- October 31 annually). For the past 5 years, this allotment has experienced drought conditions. As a result, the permittee has run reduced numbers and shorten the grazing season to help protect the range resource. Only one-third of the Badger pasture of this allotment is within the Herring Park project. This pasture is one of eight pastures used on a rest-rotation system. When stocked, this pasture is used for approximately 30 days.

The majority of the National Forest lands within the Badger pasture is forested with upland grass communities. Tree species include Blue Spruce, Ponderosa pine, Douglas-fir and Aspen. These forest stands are mature and have recently been infected with mountain pine beetles. High mortality has occurred throughout these stands, especially in the ponderosa pine and Douglas-fir.

Upland grasses increasing in quality and quantity due to decrease of overstory vegetation cover due to dead and dying trees.

Grazing within the pasture has been primarily in the bottom land and riparian areas of Cals Fork and Sawmill Gulch. This is also where the available water sources are located for the cattle to drink. The forested and uplands area have had much less use and utilization of the grass resources. This is because of the lack of water sources. Currently, the Salida Ranger District is completing an environmental analysis (EA) for the Range Allotment Management Plan (RAMPs) for this allotment.

The following describes the existing condition of the Bassam Allotment as developed through the environmental analysis (EA) currently being done for the RAMP process on this allotment:

Grassland - Good species diversity present in grasses and forbs, with a mosaic of vegetative structure. Drought stress evident. Fair- Poor condition in some pastures, good condition in others.

Stream/Riparian - Good vegetation cover. Willow and riparian graminoids present and diverse in age structure and species. Some willow die-off due to drought. Noxious weeds present in limited areas (Canada thistle). Range of condition from fair to very good, with some sites evaluated as poor.

Mesic Meadow - Riparian and upland graminoids present, but need to expand extent of wetted soils. Drought stress evident. Noxious weeds present in limited areas (Canada thistle, Russion olive). Fair to good condition. Many sites have CCC plantations of Ponderosa pine.

Bench/Transition areas – Plant loss evident on perennial grasses due to drought. Canada thistle present in some areas. Some benches early to mid-seral with high incidence of forbs. Good-fair condition.

Upland Shrub - Good growth and regeneration of mid-late seral shrub species. Native grasses and forbs interspersed. Good condition. Limited in occurance. Static trend.

Pinyon/Juniper- Limited to Bald Mtn pasture.

Aspen - Understory of down logs, forbs and grasses present, a mosaic of understory grasses vary from vigorous to decadent. Evidence of disease and die-off of aspen in some areas. Fair-good condition.

Ponderosa Pine/Mixed Conifer Forest – Ponderosa pine largely infested by mountain pine beetle. Trees dense and drought stressed. Up to 40% of this community is dead or dying. Bunchgrass understory is increasing under dead stands. Tree litter is excessive. Mixed conifer stands are mature, some evidence of mortality. Fair condition.

The ***Cameron Allotment*** currently has 275 cow/calf units permitted for a 5 month grazing season (June 1- October 31 annually). For the past 5 years, this allotment has experienced drought conditions. As a result, the permittee has run reduced numbers and shorten the grazing season to help protect the range resource. Only two pastures, Pocket and Antelope, of this allotment are within the Herring Park project. These pastures are two of twelve pastures used on a rest-rotation system. When stocked, these pastures are used for approximately 15 days, respectively.

The majority of the National Forest lands within the Pocket and Antelope pastures are forested with upland grass communities. Tree species include Blue Spruce, Ponderosa pine, Douglas-fir and Aspen. These forest stands are mature and have recently been infected with mountain pine beetles. High mortality has occurred throughout these stands, especially in the ponderosa pine and Douglas-fir.

Grazing within the pasture has been primarily in the bottom land and riparian areas of Cals Fork and Sawmill Gulch. This is also where the available water sources are located for the cattle to drink. The forested and uplands area have had much less use and utilization of the grass resources. This is because of the lack of water sources. Currently, the Salida Ranger District is completing an environmental analysis (EA) for the Range Allotment Management Plan (RAMPs) for this allotment.

Cameron Allotment-Pocket and Antelope pastures (October 2005)

The following describes the existing condition of the Cameron Allotment as developed through the environmental analysis (EA) currently being done for the RAMP process on this allotment:

Grassland – Good species diversity present in grasses and forbs, with a mosaic of vegetative structure. Bunchgrass species decreasing throughout allotment. Fringed sage increasing. High incidence of bare ground in areas. Drought stress evident. Noxious weeds present in limited areas (Canada thistle). Fair-poor condition.

Stream/Riparian – Poor-fair vegetation cover. Willow communities present and diverse in some areas. Drought stress evident. High incidence of Kentucky bluegrass and forbs. Fair-poor condition.

Mesic Meadow – Limited in occurrence on Forest Service land. Riparian and upland graminoids present, but with a high percentage of forbs. Meadows are drying and decreasing in extent.

Bench/Transition areas –High incidence of bare ground in areas. Drought stress evident. High incidence of weedy species and forbs. Fringed sage increasing. Fair-poor condition.

Upland Shrub - Good growth and regeneration of mid-late seral shrub species. Native grasses and forbs interspersed. Good-fair condition.

Pinyon/Juniper- Mature stands in places. Diverse mix of native grass, forb and shrub communities in the understory. Encroachment of pinyon/juniper in meadows and grasslands. Fair condition.

Aspen - Understory of down logs, forbs and grasses present, a mosaic of understory grasses vary from vigorous to decadent. Fair-good condition.

Ponderosa Pine/Mixed Conifer Forest – Ponderosa pine largely infested by mountain pine beetle. Trees dense and drought stressed. Up to 40% of this community is dead or dying. Bunchgrass understory is increasing under dead stands. Tree litter is excessive. Mixed conifer stands are mature, some evidence of mortality. Fair condition.

Environmental Consequences

No Action Alternative

Under this alternative current management for these allotments will continue. As trees continue to die, an increase in forage production will occur in the uplands. Cattle movement and distribution will continue to be restricted from the increase in dead, windthrown trees. Utilization of the upland grasses will also be restricted. Damage to existing range fences will continue to occur, increasing annual maintenance costs to the permittee. In the long-term the potential for a severe wildfire to occur on the allotment will increase as the fuel loading increases from the grasses and dead trees.

Current range management will continue to develop water source opportunities where ever they exist on these allotments. The springs and water sources are primarily in the uplands. Efforts are being made to develop these water sources. This will encourage better cattle distribution and utilization of the upland forage and to draw cattle away from the riparian areas in Calf Gulch, Herring Gulch, Bull Gulch and Cow Gulch. By not treating the vegetation (no action), distribution of the cattle will be limited, the investment of these water developments will not be as beneficial, and more cattle impacts on the riparians areas would be anticipated.

Cumulative effects associated with the no action Alternative include a contribution to the general decline in forest health, maintenance and increased susceptibility to stand-replacing wildfires that could be expected to involve treated stands because of the extreme intensity of those wildfires. By taking “no action” on this project, the cumulative effects of both the direct and indirect effects and other actions planned in the RAMP EA would not allow for the desired conditions to be met on these allotments nor address the issue of cattle distribution and forage utilization. Cattle distribution would be restricted, more grazing pressure would occur on the riparian areas, impacts to willows will occur and utilization of the upland grasses will be minimal. Development of range infrastures would be minimal, but the costs of maintaining existing structures would continue to increase.

Proposed Action Alternative

The actions that are being proposed will have the following beneficial effects to the range resources on all the allotments. Reducing the tree stocking levels, will allow for the increase in forage production. This will also allow for better grass species composition of desireable grasses and increase the vigor of the plants. In areas where prescribed fire is planned, similar positive effects on plant vigor, and forage production should occur. The salvage and removal of the dead timber will reduce restrictions on cattle movement, thus offering better distribution of cattle on the uplands. With the development of the planned water sources, utilization of the uplands should occur, removing pressure on the riparian areas. The maintenance costs of existing and future range structures will be less, in that less trees will be falling on these structures.

The severity of wildfires in the allotments should be reduced through the removal of the dead, heavy fuels, periodic prescribed burning, and grazing of the upland forage.

Current range management will continue to develop water source opportunities where ever they exist on these allotments. The springs and water sources are primarily in the uplands. Efforts are being made to develop these water sources. Implementing the "proposed actions" will provide access to the permittee to bring in equipment and supplies to develop these water sources. These water sources will encourage better cattle distribution and utilization of the upland forage and draw cattle away from the riparian areas. By treating the vegetation (action alternatives), better distribution of the cattle will occur, easier access to water sources will be provided, and a greater return on the investment of these water developments should occur through higher weight gains on the cattle. Less cattle impacts on the riparians areas would also be anticipated.

Cumulative Effects

Within the RAMP Environmental Analysis (EAs) being developed for these allotments, other actions are being proposed that will effect the overall management of these allotments. Water developments, pipelines, pasture fences, and timing issues are a few of other actions being considered. The salvage, thinning and prescribed fire actions proposed in these alternatives will have beneficial effects to the overall grazing management on these allotments in the next several years and should be positive for the long-term.

3.11. Economics

Management Direction

The National Forest Plan includes Forest-wide management goals to:

- Maximize Present Net Value (PNV) while emphasizing opportunities to improve water, fish and wildlife, outdoor recreation, and other amenity values.
- Manage resources at economically and environmentally feasible levels, consistent with the emphasis on amenity values.
- Provide for increased production and productive use of wood fiber while maintaining or improving other resource values.
- Provide the opportunity for economic growth of industries and communities dependent upon Forest outputs.

The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. 36 CFR 219.27 sets forth the minimum specific management requirements to be met in accomplishing goals and objectives for the USFS. Those management requirements are addressed as follows:

- Section (b) Vegetative Manipulation: (1) Multiple-use; (3) Not chosen for greatest dollar return; (7) Practical transportation, harvest requirements, and preparation and administration.
- USFS policy sets a minimum level of financial analysis for project planning (FSH 1909.17).

Local And Regional Economy

There are many long-term local residents in Chaffee, and Park County in the vicinity of the project area. People's perceptions of and desires for public land management vary greatly. Recently local concerns regarding outbreaks of diseases or fires that could affect homes and property have increased. As a result, expectations by local residents that the USFS will play an active role in preventing and dealing with such situations.

Population

It is not anticipated that the proposed action will impact any demographics of the area, but to help define the scope of the impacts certain demographic features are described.

Park County, often called 'South Park' saw significant growth in the 1990's. The population of the county is smaller than surrounding areas, currently accounting for less than one percent of the total population of Colorado, but it has more than doubled since 1990. Chaffee County also experienced significant growth in the early 1990's, but has since slowed to about one and a half percent increase each year. The following table highlights the yearly population and estimates of future growth.

Table 3.11.1 Population Growth, Chaffee/Park County and Colorado 1990 - 2005

Area	Population			Average Annual Percent Change	
	1990	2000	Est. 2005	1990-2000	Est. 2000-2005
Chaffee County	12,684	16,242	17,498	2.8	1.5
Park County	7174	14,523	17,376	7.3	3.4
Colorado	3,294,473	4,301,261	4,706,754	2.7	1.6

Source: CDOLA 2005 http://dola.colorado.gov/demog/demog.cfm

Park County's net migration is about four percent of the last five years, and Chaffee County's is about 2 percent signifying a large movement of people to the area. The growth in new residents in the project area highlights the large number of developments and subdivisions – as well as the increase in homes built next to the USFS boundary.

Housing

In describing the project area, home ownership – primary or seasonal – is an important consideration, as many of these homes surround the project area. The State average of the percent of homes that are seasonal or second homes is about 15 percent of all homes. In Chaffee County, the percentage of seasonal homes is about 16 percent and in Park County it's 41 percent.

Employment And Income

Park County doubled in total employment from 1990 to 2000, in line with the increases in population (Table 3.11.2). Employment in the construction sector accounted for the largest increase, highlighting the overall growth occurring in the county. Trades, services, and Financial, Insurance and Real Estate (FIRE) sectors also saw increases, but to a smaller extent.

Table 3.11.2 Estimated Employment by Sector for Park County and Colorado in 2002.

Industry	Chaffee County		Park County		Colorado	
	number	percent	number	percent	number	percent
Agriculture, forestry, hunting and mining	219	3.22	258	3.26	44,658	2.03
Construction	858	12.61	1,290	16.32	200,174	9.08
Manufacturing	249	3.66	564	7.14	201,169	9.12
Wholesale trade	149	2.19	207	2.62	76,339	3.46
Retail trade	831	12.21	1,004	12.71	259,845	11.78
Transport, warehousing, and utilities	294	4.32	366	4.63	107,155	4.86
Information	117	1.72	332	4.20	108,955	4.94
Finance, insurance, and real estate	447	6.57	481	6.09	169,285	7.68
Professional, scientific, management, and administrative	484	7.11	702	8.88	257,548	11.68
Education, health, and social services	1,067	15.68	1,187	15.02	374,486	16.98
Arts, entertainment, recreation, lodging, and food services	1,031	15.15	789	9.98	199,513	9.05
Other Services	366	5.38	366	4.63	104,885	4.76
Public Administration	693	10.2	356	4.51	101,182	4.59
Total	6,805		7,902		2,205,194	

Source: CDOLA 2005 http://dola.colorado.gov/demog/demog.cfm

Wood Products Industry

Associated with the salvage activities, local workforce and infrastructure for primary processing of large volumes of wood is limited. Employment in the wood products sector – which includes primary and secondary processors, has been fairly stable in Chaffee and Park County during the 10-year period. Chaffee County has about 56 wood products jobs and Park County has about 46 with a few small rough-cut mills and several gypo loggers (self-employed contractors).

Demand and Supply of Wood Products

The conditions of the United States and the global economies play a major role in U.S. timber production, prices, and market conditions. The United States continues to be the largest consumers of paper and paperboard in the world, most of which is supplied domestically or through imports from Canada (U.S. Forest Products Annual Market Review and Prospects, 1999-2002).

On average, Colorado imports 90 to 100 percent of the annual wood products used in the state. About 25 percent arrives from Canada, 10 percent from southern states, and 65 percent from other western states (Idaho, Oregon, Washington, California, Montana, Wyoming, and South Dakota). While importing wood, Colorado is exporting money, but currently there is limited infrastructure to process significant quantities of wood, or there is no market or processing facilities to use small diameter materials (Lynch, 2001).

For example, there are about 350 log home builders in Colorado, but the majority import their logs from out of state (Oregon, Washington, Idaho, Montana, Utah, Wisconsin, Pennsylvania, Canada, and Finland), because consumers desire larger logs than are generally available in Colorado (Lynch, 2001).

The need and demand for wood products are limited to the type of wood markets present within the local area. Current uses of wood products from the area include; sawlogs, houselogs, firewood, post-n-poles and POL (Products other than logs). The Pike/San Isabel National Forest has been a consistent source and supply of wood products, although at a level lower that the Forest Plan estimated would be harvested over the decade. Over the last 5 years an average ASQ (Allowable Saleable Quantity) of 12.7MCCF has been harvested annually. A majority of the sawlogs are purchased regionally by Intermountain Forest Products in Montrose, Mountain Valley Lumber in Saguache and McComb Lumber in Canon City. There is also a local demand for houselogs, firewood, post-n-poles and POL for both commercial and private use.

The material to be salvaged would include primarily firewood, but sawlogs, houselogs, post-n-poles, and POL may also be recovered. Timber value for sawlogs, houselogs firewood, post-n-poles and POL will vary upon fluctuations in the timber market and demand for products within the area. Average value for sawlogs and houselogs will vary by species. Current values for sawlogs and houselogs decked at a landing are $130/CCF. Values for miscellaneous products such as post-n-poles and POL for commercial-use are$16/CCF. Personal-use firewood is valued at $15.00/cord on the San Isabel National Forest.

Cost-Benefit Analysis

Costs would be incurred under the proposed alternative that would not occur under the no action alternative. Net costs associated with the proposed action include timber harvest and stewardship contracts, road construction and rehabilitation, timber sale preparation, and resource surveys. Costs that apply to both alternatives include cultural and natural resource surveys and system road maintenance. Costs to private property from potential large-scale wildfire are not included in this analysis because protection of private property is not part of purpose and need for this project. Even so, the proposed action is likely to indirectly reduce the potential loss of property within the project area, while the no action alternative would not reduce the potential loss.

Table 3.11.3 displays the PNV and net cost of the two alternatives.

Table 3.11.3 Comparison of Present Net Value and Net Cost

Cost Category	Alternative	
	No Action	Proposed Action
Present Net Value		
All Partners	$451,695	$-1,459,816
USFS	$451,695	$-1,440,246
Net Cost		
All Partners	n/a	$1,459,816
USFS	n/a	$1,440,246
Source: USFS cost estimations and Quicksilver software, 2005		

The proposed action alternative would have a beneficial effect on non-priced values which are not quantified in the above analysis. Such values include forest health, scenery, habitat improvements, and fuel reductions.

The importance of recreation and tourism to local and state economies may mean that the non-prices values may exceed the benefits to priced values. Non-priced values are summarized in Table 3.11.4.

Table 3.11.4 Comparison of Non-Priced Values

Value	Alternative	
	No Action	**Proposed Action**
Reduce risk of large high-intensity fires and the resulting erosion that could exacerbate soil and water quality problems.	Risk not reduced, risk would continue to increase as fuel load builds in the forest. No benefit.	Risk of high-intensity fires would be reduced.
Restore the Forest to more sustainable, historical conditions that are more resistant to fire, insects, and disease.	No benefit. Forest conditions would not be improved. Forest would remain susceptible to fire, insects, and disease.	Forest conditions would be improved by a combination of mechanical thinning treatments and burning prescriptions.
Provide habitats for MIS, special status species, and other wildlife.	Minimal benefits, habitat conditions for most species would continue to degrade as beetle infestation continues to grow. Risk of high-intensity wildfire would continue.	Creating more open forest conditions would improve habitat for most MIS and special status species over the long-term. The risk of habitat loss from large high-intensity wildfire would decrease.
Provide public use opportunities.	Scenic value would not improve and would likely continue to degrade as more trees are killed by beetle infestations. A large, high-intensity wildfire would have devastating effects to public enjoyment of the area.	Existing recreational opportunities would be maintained and risk of large-scale fire event would decrease.

3.12 Unavoidable Adverse Impacts

The effects of implementing the proposed treatments would be minimized by the use of project design criteria. However, some adverse effects cannot be avoided. There may be some decrease in long-term soil productivity because of topsoil disturbance during vegetation removal and prescribed burning operations. Changing the forest structure to that with more openings would adversely affect those wildlife or plant species that depend upon a more closed structure. Visitors would notice some disturbance to the landscape and visible disruption would occur during treatment including noise, dust, wood debris, and smoke.

3.13 Irreversible And Irretrievable Commitment Of Resources

Irreversible commitment of resources refers to the use or commitment of a resource that cannot be reversed. For example, nonrenewable resources, such as the minerals in an ore body that is mined would be removed forever during milling and would be irreversibly committed. The proposed action would not involve an irreversible commitment because the vegetation is renewable and would not be completely removed. The removed portion would be potentially replaced by new growth.

Irretrievable commitment implies the short-term loss of resources, resource production, or the use of a renewable resource because of land use allocations, or a scheduling or management decision.

The proposed action would cause an irretrievable commitment of the timber resources that are removed for sale or other disposal. Once treatments have occurred and wood products removed, those timber resources could not be retrieved. The same is true for vegetation resources that are burned in prescribed fires. However, new vegetation would eventually replace that that had been burned or otherwise removed (irretrievably committed). Any soil lost to erosion would also be considered an irretrievable commitment of the soil resource. There would be a short-term irretrievable loss of productivity in landings, skid trails, and slash piles. Design criteria would be used to minimize loss of soil productivity. Conversion of wildlife habitats would be irretrievable because the quality of these habitats would be changed in the long-term for many species.

3.14 Short-Term Use Versus Maintenance And Enhancement Of Long-Term Productivity

Long-term productivity refers to the capability of the forest to produce and provide resources into the future. Application of design criteria listed in Appendix A, would minimize the impact on long-term productivity of the forest, including soil productivity, vegetation, water resources, recreation opportunities, scenic value, and wildlife habitats. Short-term uses and impacts on these resources within the forest would not affect long-term productivity. The lower risk of fire that would result from the proposed action would help ensure long-term productivity of forest-related resources in the future.