

LAKE CREEK/BOONE  
CANYON FOREST  
RESTORATION

ENVIRONMENTAL ASSESSMENT  
OR-025-04-018-1

Bureau of Land Management  
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# LAKE CREEK/BOONE CANYON FOREST RESTORATION ENVIRONMENTAL ASSESSMENT

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## CHAPTER I. INTRODUCTION: PURPOSE OF AND NEED FOR ACTION

The Burns District Bureau of Land Management (BLM) proposes to implement forest management activities in the Three Rivers Resource Area. The area to be covered in this assessment is located in Harney County on the west side of the Silvies River, north to Lake Creek and south to Boone Canyon (T. 21 S., R. 29 E., Sections 14, 15, 22 to 27, elevation range 4,300 to 5,200 feet; Map 1). Lake Creek and Boone Canyon lie approximately 15 and 13 miles northwest of Burns, respectively. The project would be implemented over a 10 to 12-year period.

The project area consists of several dominant plant communities proposed for treatment including: low and stiff sagebrush/bunchgrasses, mountain big sagebrush/bunchgrasses, ponderosa pine/bunchgrasses, and Douglas-fir/bluegrass. Other important plant communities occurring in the project area proposed for treatment include quaking aspen, mountain mahogany, and bitterbrush. Due to livestock grazing, fire suppression, and the absence of other forest management practices, Douglas-fir, ponderosa pine, and western juniper have encroached upon important plant communities and are out of balance with historical compositions. In this document western juniper will be addressed separately from all other conifers. Western juniper is encroaching upon all the plant communities in the project area. The rapid expansion of western juniper range and a concurrent increase in the density of existing stands in southeastern Oregon began shortly after settlement of the region by Euro-Americans in the late 19<sup>th</sup> century.

The density and patch size of aspen stands and other riparian species in the project area have declined due to conifer and juniper invasion. A recent study (Wall, et al., 2001) of 91 aspen stands in the northwestern Great Basin found that three-fourths of the stands contained populations of recently established western juniper. Twelve percent of the stands were completely replaced by western juniper and 23 percent were dominated by western juniper. In the project area juniper has invaded many of the stands, but only dominates a small number of aspen sites. Other conifers (ponderosa pine and Douglas-fir) have encroached upon almost all aspen stands within the project area and are, in fact, dominating most of them.



**Figure 1:** An example of conifer invasion upon aspen stands.

Many of the aspen stands within the project area are in much worse condition than this illustration demonstrates.

The forested areas within the project area are overstocked<sup>1</sup>, which has resulted in a reduction of grasses, forbs, and shrubs. Douglas-fir stands are overstocked and have established in large numbers in historic ponderosa pine stands. Ponderosa pine stands that are not being encroached upon by Douglas-fir or juniper have become overstocked with small diameter and reproduction trees. These overstocked stands are susceptible to mountain pine beetle and western pine beetle infestations. In general, when ponderosa pine basal area stocking reaches 150 feet<sup>2</sup>/acre, susceptibility of trees to mountain pine beetles is considered high (Sartwell and Stevens, 1975). Stocking levels in these areas ranged from 160 to 240 feet<sup>2</sup>/acre (Scott, et al., 2004). Heavily overstocked and diseased stands of ponderosa pine are vulnerable to major crown fires<sup>2</sup> that can threaten human life and property, as well as cause extreme forms of resource damage.



**Figure 2:** Overstocked Douglas-fir stands occurring in the project area.

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<sup>1</sup> *Overstocked*: Having a tree density in excess of the range of historic variability.

<sup>2</sup> *Crown fire*: A fire that advances by moving among the crowns or canopies of trees and shrubs.



**Figure 3:** Existing ponderosa pine stands in the project area.

The density, patch size, and health and vigor of mountain big sagebrush/bunchgrasses, mountain mahogany, and bitterbrush stands are declining as a result of encroaching juniper and pine trees. Much of the existing mountain big sagebrush/bunchgrass communities are in an early transitional phase to a closed western juniper woodland. Juniper has also encroached into, and in many cases dominates, mountain mahogany and bitterbrush stands. Ponderosa pine has also encroached upon these plant communities. Historically, higher elevation forest fringe ecological sites were open shrub-grassland communities supporting only two to five ponderosa pine trees per acre (Munger, 1917; Erickson and Conover, 1918). Current conditions support an average of 20 to 40 ponderosa pine trees per acre.



**Figure 4:** This is an example of juniper encroachment on mountain big sagebrush/bunchgrass communities within the project area. The picture shows a mountain big sagebrush/bunchgrass community that is in a mid-transitional stage toward juniper woodland.

These are fire-dependent plant communities, which are generally well beyond their historical fire frequencies. The project area has high wildlife values due to the habitat diversity created by the juxtaposition of the different plant communities. Northern goshawks are present in the project area. The project area is classified as elk winter range. Mule deer, antelope, bobcats, several raptors, and many migratory birds and small mammals use the area as well. A historic cabin is found within the project area on the lower portion of Lake Creek.

A. Purpose and Need

The purpose of this proposal is to:

- Increase human safety, and reduce the risk of fire entering adjacent private land.
- Reduce hazardous fuels and the risk of stand replacement fires.
- Protect areas of high resource value from stand replacing wildfires, insects, and disease.
- Reduce overstocked conifer stands to improve forest health by increasing the growth and vigor of retained trees.
- Maintain or enhance important habitats such as aspen, mountain mahogany, mountain big sagebrush/bunchgrasses, and bitterbrush stands.
- Improve and restore important wildlife habitats for sage-grouse, migratory birds, and large mammals.
- Begin reintroducing fire into the area to restore and maintain fire-dependent plant communities.
- Increase the cover and density of sagebrush, grass, forbs, and riparian vegetation.
- Enhance and protect the integrity of watershed functions, improve watershed stability and decrease soil erosion.

This project is being proposed for the following reasons:

- The project area has high resource value, and is currently at risk of being lost.
- The overstocked stands pose a high risk for intense wildfires, which may compromise human safety and adjacent private property.
- Overstocked stands are resulting in a decrease in forest health by increasing competition for water, nutrients, sunlight, and increasing the susceptibility to diseases and pathogens.
- Douglas-fir and juniper are encroaching upon and outcompeting historical ponderosa pine and aspen stands.
- Juniper and ponderosa pine trees are encroaching upon and outcompeting mountain big sagebrush/bunchgrasses, mountain mahogany, and bitterbrush sites.
- Conifers are encroaching and outcompeting riparian vegetation (aspen, alder, willow, etc.).
- The overstocked stands pose an increased risk of insect infestation and disease to the area's larger trees.
- Important wildlife habitats are being lost to encroachment of Douglas-fir, ponderosa pine, and juniper.

B. Conformance with Applicable Land Use Plans

This proposed action and all other alternatives are in compliance with management direction established in the Record of Decision for the Three Rivers Resource Management Plan/Final Environmental Impact Statement (RMP/FEIS) (Chapter 2, Wildlife Habitat and Forestry and Woodlands, September 1992). This EA is also in compliance with Federal, State, tribal, and local laws, regulations, and land use plans.

CHAPTER II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. Alternatives Considered but not Developed Further

1. An alternative using only prescribed fire to treat the overstocked stands was considered. This alternative posed too much of a risk to the larger trees and other resources in need of protection and enhancement.
2. An alternative that aggressively treated the project area with mechanical methods was considered. It included commercial harvest throughout the project area, improvement of existing roads and creation of new roads. While meeting stocking level objectives this alternative was eliminated because it did not meet other resource concerns and objectives.

B. Proposed Action

The proposed action was developed by an Interdisciplinary Team, with representatives from all affected resources, with the help and recommendations from United States Forest Service (USFS) Pacific Northwest (PNW) Research Station La Grande forest researchers. The forest researcher's findings from a site visit to the project area can be found at the end of this document (See Appendix 1). The proposal is a combination of conifer (ponderosa pine and Douglas-fir) thinning, removal of juniper, aspen treatments, and prescribed fire. The project area is divided up into four vegetative communities: low/stiff sagebrush flats, mountain big sagebrush/bunchgrasses currently being dominated by western juniper and ponderosa pine, forested areas (ponderosa pine and Douglas-fir/bluegrass), and aspen stands. The fence along the lower section of Lake Creek would be fixed and/or replaced where needed, and approximately three-quarter mile of new fence and gap fence would be constructed to exclude livestock from the lower section of Lake Creek. Gap fencing along the west side of the Silvies River rim would be constructed as needed.

### Low/Stiff Sagebrush Flats

There are approximately 650 acres in the project area dominated by stiff and low sagebrush/bunchgrass communities, which are proposed for treatment (see Units 2 and 4 outlined in blue on the attached maps). These plant communities have had juniper encroach upon them. The objective in these areas is to improve sage-grouse habitat and protect the integrity of the low/stiff sagebrush flats. The proposed action in these units is to remove the juniper. All juniper trees except those showing old growth characteristics<sup>3</sup> or obvious wildlife occupation (cavities or bird nest) would be cut, lopped, and left. The work in these plant communities would be accomplished using BLM fire and fuels personnel.

### Mountain Big Sagebrush/Bunchgrass Communities

There are approximately 800 acres of mountain big sagebrush/bunchgrass communities being encroached upon, and in some cases, dominated by juniper and pine that are proposed for treatment (see Units 1 and 6 outlined in orange on the attached maps). Other important plant communities occurring within these sites include mountain mahogany and bitterbrush stands. Juniper and pine have encroached upon all vegetative communities in these areas. The objective in these areas is to restore and enhance existing mountain big sagebrush/bunchgrass, mountain mahogany, and bitterbrush sites. The proposal in all of these plant communities is to remove the encroached juniper and pine trees. Approximately 70 to 90 percent or 560 acres to 720 acres of the units would be treated. In Units 1 and 6, which are approximately 200 acres and 600 acres in size, respectively (see Maps 2 and 3), the proposal is to cut and pile encroached juniper and pine trees. All juniper trees except those showing old growth characteristics or obvious wildlife occupation would be cut and piled. Understory thinning, ranging from complete removal to a 22-foot spacing within the understory, and piling would occur on the pine trees in these units. Some medium size pine trees (10 to 26-inch Diameter Breast Height (DBH)) would also be cut in these units in an effort to return the pine component in these communities back to a historic level. Some of these trees would be girdled and left for snag habitat. Others may be hauled off site by way of stewardship contracts. This would involve temporarily improving and creating new roads within these units (1 and 6). The temporary new roads would be closed and rehabilitated after implementation. The largest pine trees in these units would be left. All juniper and pine slash would be piled unless piling is determined to be detrimental to retained vegetation (for example, in areas of dense mountain mahogany or bitterbrush). In those areas where it is determined to be detrimental to retain vegetation, slash would either be left, lopped or hand piled.

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<sup>3</sup> *Old growth characteristics:* trees with an irregular canopy, lichen on the branches, and/or deeply furrowed bark.

These areas would be identified during onsite project layout. Where piling does occur, the construction of piles would move slash away from mountain mahogany and bitterbrush vegetation as much as practical. Piling would be done by some kind of mechanized equipment other than a dozer (excavator, feller buncher, etc.). All piles would be burned after the vegetation cured. Orchardgrass, and/or ladak alfalfa, and/or cereal rye may be planted where pile burning occurs to take grazing pressure off desired browse and grasses and to reduce potential noxious weed invasion of disturbed sites. The thinning, removal of juniper, and piling work in these units would be accomplished through either service or stewardship contracts. The burning of the piles would be accomplished using BLM fire and fuels personnel.

### Forested Areas

There are approximately 1,600 acres in the project area dominated by ponderosa pine/bunchgrasses and Douglas-fir/bluegrass communities (see Units 3, 5, and 7 outlined in green on the attached maps). Other plant communities occurring within these sites include mountain big sagebrush/bunchgrass, aspen, mountain mahogany, and juniper. These units represent overstocked forested areas. The objective in these areas is to improve forest health, reduce fuel loading and the risk of stand replacement fires, and improve wildlife habitat. The proposal is to thin the understory of overstocked pine and Douglas-fir stands and remove encroaching juniper. Several untreated islands would be left to provide quality thermal and hiding cover for wildlife. These islands would be determined during onsite project layout. Approximately 70 to 90 percent or 1,125 to 1,445 acres of the area within the units would be treated mechanically. All junipers except those displaying old growth characteristics or obvious wildlife occupation would be cut and piled. Understory pine and Douglas-fir trees would be thinned using a variable tree spacing (basal areas ranging from 50 to 150 feet<sup>2</sup>/acre). All juniper, pine, and Douglas-fir slash would be piled either by hand or machine depending on feasibility and resource concerns. All piles would be burned after the vegetation cured. Orchardgrass, and/or ladak alfalfa, and/or cereal rye may be planted where pile burning occurs to take grazing pressure off desired browse and grasses. A prescribed underburn on all forested units (units outlined with green on Maps 2 and 3) would be completed 5 to 7 years after mechanical treatment. Raking of deep duff around old growth Douglas-fir and pine trees, large snags, and large down woody debris may be done prior to burning if needed. All thinning and piling work in these units would be accomplished through either service or stewardship contracts. Pile burning and prescribed underburning<sup>4</sup> would be accomplished using BLM fire and fuels personnel.

In Unit 3 (see maps), thinned conifers may be hauled off site by way of stewardship contracts. Only existing roads would be used to accomplish this.

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<sup>4</sup> *Underburning or understory burning*: Prescribed burning with a low fireline intensity fire under a timber canopy.

## Aspen

There are several aspen stands found within the forested areas (green units on attached Maps 2 and 3). All aspen stands that exist within the project area are being encroached upon by juniper, pine, and Douglas-fir. The proposal in these treatment areas is to remove the encroaching vegetation. Douglas-fir and pine trees less than 10 inches DBH would be cut, limbed, and piled. Pine and Douglas-fir trees in the 11 to 19-inch DBH size range would be cut and limbed. Only the limbs would be piled on these trees, leaving the bole to serve as down woody debris. Pine and Douglas-fir trees in the 20 to 26-inch DBH size range would either be girdled to provide snag habitat or left alone. This would be determined by affected resources. The few pine and fir trees larger than 26 inches DBH would be left alone. If it is determined to be both economically and environmentally feasible, cut conifers could be sold and removed. All junipers except those showing old growth characteristics or obvious wildlife occupation would be cut, limbed, and piled. All piling in aspens stands would be done by hand. Piles would be burned after the cut vegetation has cured. Orchardgrass, and/or ladak alfalfa, and/or cereal rye may be planted where pile burning occurs to take grazing pressure off suckers and other desired browse and grasses. Aspen stands could be fenced to protect aspen suckers from browsing animals. This would be determined through monitoring. If a fence is determined to be needed, it would be removed after new suckers obtain a height where the apical bud is 7 feet or higher.

## Project Design Features

- Archaeology, botanical, and wildlife clearances would be done prior to any implementation of the proposed action. Where archaeological sites or Special Status flora or fauna are found appropriate measures would be taken.
- Protect cultural resource values throughout the life of the project. Archaeological sites would be avoided within the mechanical treatment units and activity generated fuels would not be piled within the boundaries of sites. Sites with combustible constituents would be protected during the deployment of prescribed fire by black-lining resources and use of appropriate ignition techniques. The District Fire Archaeologist would approve burn plans prior to project implementation.
- Protect Special Status vegetation species throughout the life of the project. Special Status plant populations would be avoided within mechanical treatment units if necessary. Fire intolerant sensitive plants would be protected during deployment of prescribed fire by black-lining resources and use of appropriate ignition techniques. The District Fire Botanist would approve burn plans prior to project implementation.

- Protect Special Status wildlife species and their habitat throughout the life of the project. Structures or areas with Special Status species habitat value identified during wildlife surveys would be protected during project implementation. The District Fire Wildlife Biologist would approve burn plans prior to project implementation.
- Maintain suitable big game hiding and thermal cover within mechanical fuels reduction and mountain mahogany enhancement treatment units.
- Avoid mechanical cutting of juniper, ponderosa pine, or Douglas-fir with old growth characteristics or obvious wildlife occupation (cavities or nests).
- Existing snags and large down woody debris would be retained to the extent practical. Snags and downed woody debris would be created if necessary in the mechanical treatment units. A minimum of one snag per acre would remain in the mechanical units following treatment. Snags would be created by girdling medium to large diameter ponderosa pine or Douglas-fir trees. Large downed wood may be protected by foaming, blacklining, or constructing handline around specific areas.
- The risk of noxious weed introduction would be minimized by ensuring all equipment (including all machinery, 4-wheelers, and pickup trucks) is cleaned prior to entry to the site, minimizing disturbance activities, and completing follow-up monitoring, for at least 3 years, to ensure no new noxious weed establishment. Should noxious weeds be found, appropriate control treatments would be performed.
- Piles would be burnt when soil moistures are high or under frozen soil conditions to reduce the threat of escape.

### C. No Action Alternative

Under this alternative no treatments described in the proposed action would be implemented. Management under the no action alternative would continue under the current Three Rivers RMP and all other relevant policy direction.

## CHAPTER III. AFFECTED ENVIRONMENT

A general description of the existing environment for the area can be found in the Three Rivers RMP/FEIS. The terrain in the Lake Creek/Boone Canyon project area ranges from flats to steep canyons. All aspects can be found within the project area, but in general most of the project area could be described as a northeast aspect. Elevation ranges from 4,300 feet to 5,200 feet in the project area.

The following critical elements of the human environment have been analyzed in the Three Rivers RMP/FEIS, and are not known to be present in the project area or affected by enacting either alternative, and therefore, will not be addressed further in this document: Wilderness, Wilderness Study Areas, Areas of Critical Environmental Concern, Wild and Scenic Rivers, American Indian Religious Concerns, Paleontology, Floodplains, Prime or Unique Farmlands, and Hazardous Materials. The following two critical elements are not discussed in the Three Rivers RMP/FEIS:

Adverse Energy Impacts: There is no known potential for energy resource development in the project area.

Environmental Justice: There are no economically disadvantaged or minority populations present within the project area.

The following critical elements are present and will be analyzed in the document: air quality, water quality, migratory birds, wetlands and riparian, Special Status species (wildlife and plants), noxious weeds, and cultural heritage. Noncritical elements which are present and will be analyzed in this document are soils, vegetation, wildlife, fisheries, rangeland management, recreation, visual resources, socioeconomics, forestry, fire management, and realty.

This section describes site-specific affected environmental components. The discussion is divided into critical and noncritical elements.

#### A. Critical Elements

##### 1. Air Quality

The air quality currently meets or exceeds air quality standards outlined by the Oregon Department of Environmental Quality (DEQ). Due to the long distance from large metropolitan areas and factories, ambient air quality is generally good with few particulates or other pollutants.

##### 2. Water Quality

Silvies River - BLM has not collected water temperature data for the Silvies River. The Silvies River is not on the DEQ 303(d) list for water temperature, however, four tributaries on that list flow into the Silvies River upstream of the Silvies Canyon Allotment. Therefore, it is possible that the Silvies River is also limited by high water temperatures.

Lake Creek - No formal water quality monitoring has occurred along Lake Creek. Current conditions are unknown at this time. The riparian area is dominated by woody species that provide shade from solar heat input. The steep canyon also provides a significant amount of topographic shade which also buffers solar input.

Unnamed Creek in Boone Canyon - The drainage contains an ephemeral stream that is generally dry by mid-summer. Water quality has not been tested; therefore, we are unable to assess the affected environment.

### 3. Wetlands and Riparian

Silvies River - The portion of the Silvies River along the project boundary is approximately 3.7 miles long and characterized by a wide channel with deep pools. Peak flows for the Silvies River in this area generally occur in April while the lowest flows generally occur during September. In 1998 a Proper Functioning Condition Assessment determined that the portion of Silvies River affected by the proposed action was considered Functioning at Risk – Trend Upward. Conditions have not changed since that assessment.

Lake Creek - The treatment area along Lake Creek is in a steep, narrow canyon that restricts the lateral migration of the creek. The proposed action would treat all portions of this creek on public land, approximately 1.7 miles. The riparian area is dominated by woody species that provide streambank stability and shade from solar heat input. Currently, aspen stands along Lake Creek are being encroached and outcompeted by conifers and junipers, and are not fully expressing their potential.

Unnamed Creek in Boone Canyon – This is an ephemeral drainage that generally does not support riparian obligate species.

### 4. Migratory Birds

Surveys have been completed for migratory birds. A variety of species, including ground nesters, cavity nesters, and shrub and tree nesters, were recorded. Table 1 lists the species found within or near the project area. This data was collected from breeding bird surveys and by site visits to the project area. Other species are likely to exist, but were not observed during surveys or site visits.

Table 1. Migratory Birds Observed Within and Near Proposed Project Area

Turkey Vulture	American Crow	Common Raven
Northern Goshawk	Sharp-shinned Hawk	Red-tailed Hawk
Common Nighthawk	Willamson’s Sapsucker	Downy Woodpecker
Hairy Woodpecker	White-headed Woodpecker	Mourning Dove
Red-shafted Flicker	Northern Flicker	Willow Flycatcher
Hammond’s Flycatcher	Gray Flycatcher	Dusky Flycatcher
Say’s Phoebe	Cassin’s Vireo	Warbling Vireo
Stellar’s Jay	Clark’s Nutcracker	Mountain Chickadee
Black-capped Chickadee	Red-breasted Nuthatch	White-breasted Nuthatch
Pygmy Nuthatch	Western Bluebird	Mountain Bluebird
Townsend’s Solitaire	American Robin	Yellow Warbler
Audubon’s Warbler	Common Yellowthroat	Western Tanager

Green-tailed Towhee	Chipping Sparrow	Oregon Junco
Cassin's Finch	Brewer's Blackbird	Brown-headed Cowbird
Bullock's Oriole	Red Crossbill	Pine Siskin

5. Threatened, Endangered, and Special Status Species - Flora

There are no known Federally listed Threatened or Endangered plant species found within or adjacent to the project area. Botanical clearances have been completed and one Special Status plant species (dwarf lousewort) was found within the project area.

Dwarf lousewort, is a Bureau Tracking species, but was recently dropped off the Oregon Natural Heritage Program list. Dwarf lousewort has been found in a wide variety of vegetation types and is tolerant of disturbance, including fire and fuels reduction cutting treatments. Dwarf lousewort commonly occurs along the interface between juniper woodlands and sagebrush flats. Dwarf lousewort has been found in large numbers over many thousands of acres. This species was found in large numbers throughout the nonforested parts of the project area.

6. Threatened, Endangered, and Special Status Species - Fauna

a. Terrestrial Species

There are no known Federally listed Threatened or Endangered wildlife species found within or adjacent to the project area. There are two species found within the project area that have increased monitoring due to population concerns. These species are sage-grouse and northern goshawks.

Sage-grouse are found in the general vicinity of the project area. The nearest known lek is approximately 5 miles southeast. The low and stiff sagebrush flats, and mountain big sagebrush/bunchgrass sites in the project area are probable habitat for sage-grouse, but sage-grouse use in these areas has not been determined. Approximately 500 acres within the project area is historic habitat, but is currently not functioning as habitat due to juniper encroachment.

In July of 2003, inventories for northern goshawks were conducted in a portion of the project area. One active nest was discovered on the upper portions of Lake Creek. Northern goshawk inventories will be performed throughout the project area in 2004.

There are several other Special Status species which are suspected to occur or there may be potential for habitat in the project area. These include but are not limited to pileated woodpecker, Williamson's sapsucker, white-headed woodpecker, and pygmy nuthatch. The pileated woodpecker and Williamson's sapsucker are Bureau Tracking species which have been documented in the general area. The white-headed woodpecker and pygmy nuthatch are Bureau Sensitive species that are suspected to occur within the project area.

b. Aquatic Species

Silvies River - Great Basin redband trout, a Bureau Tracking species in Oregon and Malheur mottled sculpin, a Bureau sensitive species in Oregon, both inhabit the Silvies River, which borders the eastern edge of the project boundary. These species prefer cool, clear, fast flowing water with clean cobbles and gravels and spawn during the spring. Large woody debris from Douglas-fir and ponderosa pine stands has contributed to the stability of the stream channel and complexity of the aquatic habitat in the Silvies River.

Lake Creek – An inventory for fishery resources has not been conducted on this creek. The state of Special Status fish species is not known at this time. The creek is a perennial stream that flows into the Silvies River, which contains both Great Basin redband trout and Malheur mottled sculpin. Consequently, there is a chance that these species occupy Lake Creek as well.

Unnamed Creek in Boone Canyon – This ephemeral drainage runs water for part of the year. It is unlikely that any Special Status fish reside in this creek; however, a presence/absence inventory has not been conducted, therefore, this statement cannot be confirmed or denied.

7. Noxious Weeds

There have been no systematic weed inventories conducted in this area. Botanical clearances are scheduled to be done in the summer of 2004. The few known noxious weed sites occurring within the project area were discovered incidentally. Weed sites within the project area include a small patch each of medusahead rye and whitetop. There are some weeds known to occur adjacent to the project area. These include medusahead rye and whitetop as well as Dalmatian toadflax and Russian knapweed. These areas have received periodic treatment and will continue to receive treatment in the future.

## 8. Cultural Heritage

The Lake Creek/Boone Canyon project area has most likely been occupied by humans to some extent for the last 12,000 years. Upland ecosystems in the Harney Basin played an important role in hunter – gatherer subsistence – settlement patterns during the ethnographic and prehistoric periods (Couture, 1986). Archaeological evidence suggests that the Silvies Plateau was most intensively occupied between 3,000 and 500 years ago (Reid, et al., 1990).

Historically, the project area may have been utilized by homesteaders and ranchers in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. Europeans probably first explored the vicinity of the project area in 1826 as Peter Skene Ogden led fur trapping parties into the Silvies River drainage. Ogden described a country that had been “overrun by fire” and bands of Indians were, in his estimation, responsible for damaging valuable beaver habitat (Davies, 1961).

As Ogden moved south from the Emigrant Creek-Silvies River divide in October of 1826 he described a large burned area in his journal:

“We followed down the stream for ten miles and encamped, the Country being burnt for a long distance in advance obliged us to camp earlier than I intended, but our horses required food.”

In June of 1827 Ogden and the Snake Country brigades returned to the Silvies and were trapping the river north from Malheur Lake toward the mountains. During this expedition, Ogden remarked:

“Many small streams have been discovered in the mountains and were not long since well supplied with beaver but unfortunately the Natives have destroyed them all and probably by the aid of fire which is certainly a most destructive mode of exterminating them for scarcely ever one escapes particularly when the streams are not wide, and from what I have seen in this my last years travels I will venture to assert without exaggeration the Natives have destroyed and principally by fire upwards of sixty thousand beavers...”

There have not been any systematic cultural resource inventories conducted within the Lake Creek/Boone Canyon project area. Furthermore, no cultural resources have been documented in the area, except an old cabin, which exist within the planning area. Prior to project implementation, a Class III cultural resource inventory would be required to comply with the terms of the Protocol for Managing Cultural Resources on Lands Administered by the BLM in Oregon. The Protocol describes how the BLM and the Oregon State Historic Preservation Office will cooperate under a national Programmatic Agreement to meet the requirements of Section 106 of the National Historic Preservation Act.

There are 2,600 acres within the Lake Creek/Boone Canyon planning that is considered “High Probability” for the occurrence of cultural resources. Many historic properties documented in the vicinity of the planning area contain or are adjacent to accumulations of hazardous fuels.

B. Noncritical Elements

1. Soils

There are two general soil types within the project area (Merlin-Observation-Lambring and Gaia-Anatone-Royst).

Merlin-Observation-Lambring are the typical soils found in the mountain big sagebrush/bunchgrass communities and low and stiff sagebrush flats (Units 1, 2, 4, and 6). The Merlin-Observation-Lambring series is characterized by shallow to very deep well-drained soils formed on weathering basalt, andesite, tuff, and gravity deposited volcanic material. The soils range in depth from 18 to 40 inches in depth and have low to moderate potential for surface erosion (Soil Survey Staff, National Resources Conservation Service (NRCS), 2004). This soil series is dominant in the lower and middle elevational shrublands in the planning area. Gaia-Anatone-Royst are the typical soils found in the forested areas within the project area (Units 3, 5, and 7). The Gaib-Anatone-Royst series consists of shallow to moderately deep well-drained soils formed on loess, volcanic ash, and weathering basalt, andesite, and tuff. Soils range from 13 to 36 inches in depth and have low to moderate potential for surface erosion (NRCS, 2004). This soil series is dominant in the higher elevational ponderosa pine forest–forest fringe environments in the planning area. A more detailed description of the soils specific to the units follows below:

Units 1 and 6

General Soil Name: Merlin-Observation-Lambring  
Soil Texture: Very Cobbly Loam; Very Gravelly Loam  
Soil Depth: Moderately Deep (20 to 40 inches)  
Soil Drainage: Well-drained  
Water Erosion: Low  
Wind Erosion: Low  
Landform: Hills and Tablelands  
Slope: 2 to 20 percent

#### Units 2 and 4

General Soil Name: Merlin-Observation-Lambring  
Soil Texture: Very Stony Loam; Very Cobbly Loam  
Soil Depth: Very Shallow to Shallow (0 to 20 inches)  
Soil Drainage: Well-drained  
Water Erosion: Moderate  
Wind Erosion: Low  
Landform: Hills and Tablelands  
Slope: 2 to 20 percent

#### Units 3 and 7

General Soil Name: Gaia-Anatone-Royst  
Soil Texture: Gravelly Loam; Stony Loam  
Soil Depth: Shallow (10 to 20 inches)  
Soil Drainage: Well-drained  
Water Erosion: Moderate  
Wind Erosion: Low  
Landform: Hills  
Slope: 2 to 30 percent

#### Unit 5

General Soil Name: Gaia-Anatone-Royst  
Soil Texture: Gravelly Loam  
Soil Depth: Shallow (10 to 20 inches)  
Soil Drainage: Well-drained  
Water Erosion: Very High  
Wind Erosion: Low  
Landform: Canyons and Hillsides  
Slope: 20 to 60 percent

## 2. Vegetation

There are seven units in the project area that have been proposed for treatment. The vegetation input will be broken down by unit for clarity. In general, our Geographic Information System data and Ecological Site Inventory data does not completely reflect the presence of western juniper and Douglas-fir which have encroached on the various plant communities. Aspen populations exist within this project area in small relict populations and are not represented in the general vegetation data. Western juniper in particular has become a major component in these vegetation systems. Douglas-fir is also responding as an increaser plant species in the absence of historic fire regimes. See Chapters 1 (Introduction) and 2 (Proposed Action) for additional plant community data which is not repeated to avoid redundancy.

### Unit 1

General Vegetation - Mountain big sagebrush/grassland

Dominant Vegetation - Mountain big sagebrush/Idaho fescue/ponderosa pine/mountain mahogany

Potential Plant Community - Mountain big sagebrush/Idaho fescue/bluebunch wheatgrass; mountain mahogany/ponderosa pine/bitterbrush/Idaho fescue/bluebunch wheatgrass

### Unit 2

General Vegetation - Low sagebrush/grassland

Dominant Vegetation - Low sagebrush/Idaho fescue

Potential Plant Community - Mountain big sagebrush/Idaho fescue/bluebunch wheatgrass/one spike oatgrass

### Unit 3

General Vegetation - Forested

Dominant Vegetation - Ponderosa pine/mountain big sagebrush/Idaho fescue; mountain mahogany/Idaho fescue

Potential Plant Community - Ponderosa pine/western juniper/mountain big sagebrush/Idaho fescue/bluebunch wheatgrass; mountain mahogany/ponderosa pine/bitterbrush/Idaho fescue/bluebunch wheatgrass

### Unit 4

General Vegetation - Stiff sagebrush

Dominant Vegetation - Stiff sagebrush/Sandberg's bluegrass; low sagebrush/Sandberg's bluegrass

Potential Plant Community - Stiff sagebrush/one spike oatgrass/Sandberg's bluegrass; low sagebrush/Idaho fescue/bluebunch wheatgrass/one spike oatgrass

### Unit 5

General Vegetation - Western juniper/mountain big sagebrush/forested

Dominant Vegetation - Western juniper/mountain big sagebrush; ponderosa pine/Idaho fescue. Additionally Douglas-fir/bluegrass species

Potential Plant Community - Ponderosa pine/western juniper/mountain big sagebrush/Idaho fescue/bluebunch wheatgrass; ponderosa pine/bitterbrush/mountain big sagebrush/Idaho fescue

## Unit 6

General Vegetation - Mountain big sagebrush/grassland

Dominant Vegetation - Mountain big sagebrush/Idaho fescue; ponderosa pine/mountain mahogany

Potential Plant Community - Mountain big sagebrush/Idaho fescue/bluegrass species; mountain mahogany/ponderosa pine/bitterbrush/Idaho fescue/bluegrass species

## Unit 7

General Vegetation - Forested

Dominant Vegetation - Ponderosa pine/mountain big sagebrush/Idaho fescue; mountain mahogany/Idaho fescue

Potential Plant Community - Ponderosa pine/western juniper/mountain big sagebrush/Idaho fescue/bluebunch wheatgrass; mountain mahogany/ponderosa pine/bitterbrush/Idaho fescue/bluebunch wheatgrass

### 3. Wildlife

The entire project area is classified as mule deer winter range. About one-quarter of the project area can be classified as Rocky Mountain elk winter range. The project area is spring, summer, and fall range for deer, elk, and pronghorn antelope. The project area also provides habitat for introduced wild turkeys. Waterfowl are common to the Silvies River, which borders the project boundary on the east side. Several raptors also frequent the area. The project area also provides habitat for many other bird species and a myriad of small mammals as well as cougars, bobcats, and coyotes.

### 4. Fisheries

Silvies River - Great Basin redband trout, a Bureau Tracking species in Oregon and Malheur mottled sculpin, a Bureau sensitive species in Oregon are both present in the area affected by the proposed action. Other native and nonnative fish known to inhabit the Silvies River are listed below:

#### NATIVE FISH

Bridgelip sucker  
Chiselmouth  
Largescale sucker  
Longnose dace  
Northern squawfish  
Redside shiner  
Speckled dace

#### NONNATIVE FISH

Bluegill  
Brook trout  
Brown bullhead  
Common carp  
Largemouth bass  
Smallmouth bass  
Pumpkinseed  
White crappie  
Yellow perch

Note: The nonnative fish species are mainly found downstream of the project area but have been known occur within the area as well.

Lake Creek - An inventory for fishery resources has not been conducted on this creek. The composition of fish species here is not known at this time. The creek is a perennial stream that flows into the Silvies River. Consequently, there is a chance that some of these species occupy Lake Creek as well.

Unnamed Creek in Boone Canyon - This ephemeral drainage runs water for part of the year. A fish inventory has not been conducted; therefore, the status of fish presence is unknown at this time.

#### 5. Rangeland Management

The proposed project is located in the Lake Creek Pasture of the Skull Creek Allotment #7030, and Silvies Canyon #7053 grazing allotments. The season of use in the Lake Creek Pasture of the Skull Creek Allotment is every other year from May 1 to June 5. Use in the Silvies Canyon Allotment occurs between September 1 and October 31 as trailing use only for a maximum of 5 days. There are three permittees in the Skull Creek Allotment and one permittee in the Silvies Canyon Allotment.

#### 6. Recreation

Primary recreation activities in the planning area are associated with hunting big game such as mule deer, Rocky Mountain elk, and pronghorn antelope, and angling on the Silvies River. Other recreation activities are associated with driving for pleasure, hiking, and wildlife viewing.

#### 7. Visual Resource Management

The project areas are remote and are not visible from any highway. Approximately 50 percent of the project area is classified as a Visual Resource Management (VRM) Class IV. Management direction from the Three Rivers RMP for a VRM Class IV allows for modification of the landscape character. The other 50 percent of the project area is classified as a VRM Class III. Management direction from the Three Rivers RMP for a VRM Class III requires partial retention of the landscape character.

#### 8. Economic and Social

Ranching and lumber industries are the primary sources of employment in eastern Oregon communities. Forest management programs on public and private lands have a long-term, stabilizing influence on local employment and standards of living. Tourism and recreational activities have a substantial effect on local economies, especially hunting.

## 9. Forestry

The forested areas in the project area are of two distinct types:

Units 1 and 6 can generally be described as being ponderosa pine woodland. These stands are characterized by scattered large diameter ponderosa pines dispersed into mountain big sagebrush/bunchgrass communities. These trees occur at densities of about one to three trees per acre and are generally greater than 24 inches DBH and are more than 300 years old. Locally dense pockets of these large pines occur, generally less than 5 acres in size. Throughout these units invaded ponderosa pines from 1 to 20 inches DBH are very common. These trees are generally less than 100 years old and can be characterized as being open grown and limby, with black bark and limbs most of the way to the ground. These trees became established due to the lack of wildfire and are considered to be far more common than the historical stocking levels. These pines and western junipers of similar age have invaded the mountain big sagebrush/bunchgrass and mountain mahogany communities and are beginning to dominate the site. Past management in the area has been limited to livestock grazing and fire suppression. Snags and downed logs occur infrequently. Health and vigor of the pine trees in these units is generally good.

Units 3, 5, and 7 are ponderosa pine and Douglas-fir forests. The vast majority of the area can be characterized as having an overstory that is moderately stocked with large diameter (greater than 24-inch DBH) ponderosa pine. Near the Silvies River the stands transition to a mixed ponderosa pine and Douglas-fir overstory of large diameter trees. Throughout the project area the understory trees are substantially overstocked with far more trees per acre than what historically existed. The dense understory varies from a small pine reproduction (0 to 5 inches DBH) to pole timber (5 to 11 inches DBH) and some areas of small sawtimber (11 to 21 inches DBH). Past management in the area has been limited to fire suppression, with no harvest or thinning. The exception is in Unit 3 where, at the headwaters of Lake Creek, there was a limited harvest of a few big trees as evidenced by a few scattered big stumps that appear to be 50 years old. Overall health and vigor of all the stands is poor. Stocking levels are substantially higher than historical levels and has lead to increased stress on trees and increased susceptibility to insects and pathogens. Pockets of bark beetle killed pines are common. Dwarf mistletoe occurs in localized areas of Douglas-fir. The number of snags is generally low with a few areas of large diameter old pine snags. Locally there are pockets of beetle-killed pole-sized snags. The majority of the project area has deep duff (4 to 8 inches deep) with minimal herbaceous and grass cover. The large old growth trees can have excessive duff layers, often more than 10 inches. Aspen occurs in a number of areas on the north and east facing slopes. These shade intolerant aspen stands are being overtopped by conifers and are shrinking in size due to ongoing mortality and no reproduction. Where live aspen still do exist, they are of generally low vigor with skeletons of dead aspen trees quite common.

## 10. Fire Management

The project area is currently experiencing a buildup of live and dead fuels (high fuel loading). Ladder fuels go from the surface and continue up into the crowns. An unnaturally deep duff layer (4 to 8 inches) is found throughout the project area. The canopies are very dense and continuous. In the general technical report “Development of Coarse-Scale Spatial Data for Wildland Fire and Fuels Management,” two layers were developed to evaluate ecological conditions and risks to ecosystem components: one being Historic Natural Fire Regime, a layer of fire frequency and severity, and the other being Fire Regime Condition Class (FRCC). FRCC is a classification of the amount of departure from the natural fire regime. Coarse-Scale FRCC classes have been defined and mapped by Schmidt, et al. (2002). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historic natural fire regime.

This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and diseased mortality, grazing, and drought). There are no wildland vegetation and fuel conditions that do not fit within one of the three classes. A simplified description of the FRCC and associated potential risks is presented below (Table 2).

The Lake Creek/Boone Canyon site is an example of a FRCC 3. FRCC 3 indicates a significantly altered fire regime. There exists a high risk of losing key ecosystem components from fire. The average number of years between fire has increased from 10 to 25 to over 100 years resulting in dramatic changes in the size, frequency, intensity, and/or severity of fires. Vegetation attributes have been significantly altered from the historical range (Schmidt, et al., 2002). The exclusion of fire has also greatly expanded the western juniper in the project area. Changes in fire frequency have also allowed juniper and ponderosa pine to rapidly move into other communities. The changes in the ponderosa pine forest are due to Euro-American land management practices, including grazing, logging, and fire suppression that have resulted in these dense stands of ponderosa pine and Douglas-fir.

Table 2. Fire Regime Condition Classes (from Hann and Bunnell, 2001).

FRCC	DESCRIPTION	POTENTIAL RISKS
<b>Class 1</b>	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	*Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics). *Composition and structure of vegetation and fuels are similar to the natural (historical) regime.
<b>Class 2</b>	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	*Risk of loss of key ecosystem components (e.g., native species, large trees, and soil) is low. *Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). *Composition and structure of vegetation and fuel are moderately altered. *Uncharacteristic conditions range from low to moderate; risk of loss of key ecosystem components is moderate.
<b>Class 3</b>	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	*Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). *Composition and structure of vegetation and fuel are highly altered. *Uncharacteristic conditions range from moderate to high. *Risk of loss of key ecosystem components is high.

11. Realty

All land within the project area proposed for treatment is BLM administered. The land surrounding the project area is predominately BLM-administered land as well, however, there are several large and small parcels of private land that either border the project area, or are found in the general vicinity. Within the project area, there is one 80-acre parcel of private property. Access to the project area would be via the Skull Creek Road, a BLM access road with exclusive public easements where it crosses private land.

CHAPTER IV. ENVIRONMENTAL CONSEQUENCES

A. Proposed Action: Critical Elements

1. Air Quality

Moderate to heavy smoke would be produced on the days of prescribed burning. Visibility in the vicinity of the planning area and the surrounding communities may be affected by a smoky haze for 2 to 4 days following ignition. In this area, prevailing winds generally transport smoke toward the east. As smoke is transported it dissipates into the atmosphere. Particulates produced during the burn would be far below standards for the pollutant established in Federal and State law.

## 2. Water Quality

The proposed action calls for both prescribed burning and mechanical treatments near or in riparian areas. The effects of these actions would be characterized by short-term negative impacts with long-term benefits. Prescribed burning could increase sediment input to the streams. A temporary increase in sediment and turbidity could decrease light penetration and inhibit primary production in the effected creeks (Lake Creek, Silvies River). The removal of shade providing vegetation could also cause an increase to water temperatures. However, this is expected to be a short-term impact as the removal of the encroaching conifers and juniper should facilitate the reestablishment of a riparian hardwood community. Timing of the burn can affect the amounts of erosion and sedimentation rates. The areas that are fall burned could experience greater amounts of erosion, since vegetation would not regrow prior to spring runoff, than areas that are spring burned. Thinning of the tree canopies would reduce interception and transpiration allowing more water to enter the soil and move down-slope to streams.

## 3. Wetlands and Riparian

Silvies River - Most of the proposed treatments near the Silvies River occur upslope of the riparian zone. Minimal impacts are expected. The proposed action would facilitate the recovery of riparian hardwood communities to a more historic level.

Lake Creek – The proposed action would facilitate the recovery of riparian hardwood communities to a more historic regime. Riparian vegetation has adapted to fluvial disturbances, like fire, which facilitate survival (Dwire and Kauffman, 2003). These same adaptations contribute to a rapid recovery of streamside habitat following disturbance from prescribed fires.

## 4. Migratory Birds

The effects on migratory birds would depend on the treatment and vegetation that is being treated. The overall net effect of the proposed action would likely be an increase in habitat diversity and an increase in avian species diversity. Direct impacts to migratory birds would be minimized by pile burning in the fall, and cutting and piling in the fall where determined necessary.

In the forested areas (Units 3, 5, and 7) the proposed action would open up the stands allowing grasses, forbs, and herbaceous species to regenerate. The opening of the stands would also increase the health and vigor of retained trees, thus, promoting larger trees in the long term. Snag and down woody debris habitat would also increase as the proposed action allows some mid-size trees to be girdled or cut and left. All of the above would increase vegetative species and habitat diversity, which would likely increase avian diversity and richness.

Cavity nesters and other birds that utilize snags and larger trees would be beneficially affected as a result of the proposed action. Other avian species that favor open stands would be beneficially affected as well. There would be a reduction in habitat quality for birds that prefer dense conifer understories.

In the mountain big sagebrush/bunchgrass plant communities (Units 1 and 6), juniper and pine have encroached upon mountain big sagebrush/bunchgrasses. Where junipers and pine have developed into woodlands on mountain big sagebrush/bunchgrass sites migratory bird diversity and richness is relatively low. The removal of juniper and pine trees in these areas would regenerate grasses and forbs. Herbaceous plants including sagebrush and bitterbrush would also regenerate as a result of the proposed action. As these species regenerate, there would be a shift toward grassland and sagebrush-dependent species and away from woodland species. This change in habitat would likely cause bird diversity and richness to increase.

In Units 1 and 6, where juniper and pine are in an intermediate stage of transition to woodlands, migratory bird diversity and richness is relatively high. The proposed action is to use mechanical treatments to remove the invading juniper and pine. Overall, avian diversity in these areas is likely to remain the same or slightly decrease.

Avian species which utilize low and stiff sagebrush flats (Units 2 and 4) would be beneficially affected as a result of the proposed action. The proposed action would maintain and enhance low and stiff sagebrush plant communities by having the encroaching juniper cut out of them. The removal of juniper out of these communities would also remove predatory raptor perches, thus, improving habitat for small bird species.

Quaking aspen and mountain mahogany sites are randomly dispersed throughout the entire project area. The proposed action would remove competing vegetation (juniper, pine, and Douglas-fir) from these communities. Migratory bird species, which utilize quaking aspen and mountain mahogany stands would be beneficially affected as the proposed action would perpetuate the aspen and mountain mahogany stands. The protection and enhancement of these communities would ensure long-term availability of aspen and mountain mahogany habitats for migratory birds in the future.

#### 5. Threatened, Endangered, and Special Status Species - Flora

There are no known effects to Threatened or Endangered plant species under this alternative. The proposed action would have no known effects on dwarf lousewort. It has been found in a wide variety of vegetation types and is tolerant of disturbance, including fire and fuels reduction cutting treatments.

6. Threatened, Endangered, and Special Status Species - Fauna

a. Terrestrial Species

There are no known effects to Threatened or Endangered wildlife species under this alternative. The proposed action would have effects on sage-grouse, northern goshawks, and their habitats.

The juniper and pine removal in Units 1 and 6, where juniper and pine have invaded mountain big sagebrush communities, will beneficially effect sage-grouse. These areas are likely to become sage-grouse habitat again, as predatory raptor perches are removed and mountain big sagebrush/ bunchgrass communities recolonize the area.

The low and stiff sagebrush flats are areas of probable sage-grouse habitat, but use is uncertain. The proposed action would have encroaching juniper cut out of these areas. This would remove predatory raptor perches, thus, improving sage-grouse habitat.

Under the proposed action northern goshawk habitat would either be maintained or enhanced. Goshawk habitat is likely to persist in the event of a wildfire, as a wildfire occurring in the project area after implementation of the proposed action is unlikely to be stand replacing. Goshawk prey populations are likely to increase as the proposed action is likely to attract more songbirds to the area. Direct effects on goshawks would be minimal as nesting and fledging seasons would be avoided.

b. Aquatic Species

The project area borders the Silvies River which contains two Special Status fish, Malheur mottled sculpin and Great Basin redband trout. It also incorporates Lake Creek, a perennial stream that may contain these species as well. Most of the treatment near the Silvies River would occur upslope of the riparian zone. Due to topography, the majority of the thinning work in these areas would be done via hand piling and cutting. This would reduce direct disturbance to Special Status species by eliminating the impacts associated with machinery near and in riparian areas.

The greatest indirect effects to fish species from this project are likely to be related to additional input of sediment to the stream following prescribed burn and decreased shade following the thinning. Greater amounts of fine sediment introduced to the stream can temporarily reduce aquatic invertebrates reducing food for juvenile salmonids, blanketing spawning gravel and clogging fish gills. Depending on several factors (i.e., timing of burn, storm events) the severity of erosional impacts would vary. More impacts are likely to occur during a fall burning because the chance of completely removing surface vegetation and litter from the forest floor is greater. Revegetation may not occur in time to slow spring runoff. During a spring burn, the surface fuels would have a higher moisture content and, therefore, there is a greater likelihood of only a partial burn occurring, leaving some ground cover to reduce erosion during a rainfall event. Regardless of timing, these impacts are expected to be short term. Once riparian herbaceous vegetation recovers and the surrounding areas revegetate sediment would be trapped before entering the stream channel.

Removing shade providing vegetation near the creek's edge could cause an increase to water temperatures. This would be a short-term impact with overall long-term benefits. The proposed action would facilitate the recovery of a riparian hardwood community to restore the riparian zone to more natural conditions. With the reestablishment of this community, greater bank stability and increased shading is expected. The controlled burning following the thinning would stimulate regeneration of some riparian species that have become decadent due to fire exclusion (i.e., aspen), also contributing to stream shading. The treatment area along Lake Creek, which would have the greatest amount of shade providing vegetation is removed, is buffered by this loss from the topographic shade from the canyon sides; therefore, an increase to stream temperature from loss of vegetation is likely to be minimal.

Overall, the fish species present are not expected to be adversely affected by disturbances to habitat resulting from the prescribed burning and thinning. Species such as redband trout appear to be well adapted to intermittent disturbances such as those created by fire (Rieman and Clayton, 1997). The natural recovery patterns are expected to be sufficient to preclude long-term degradation of fish resources. Successfully reestablishing more natural patterns and processes could lead to long-term restoration of more complex, productive aquatic habitats, thus benefiting redband trout and Malheur mottled sculpin.

7. Noxious Weeds

There would be minimal increases in the risk of introduction of new weed populations or the expansion of existing weed populations as a result of implementing the proposed action. Monitoring for noxious weeds would occur and any weeds attempting to establish a population would be treated.

8. Cultural Heritage

Under the proposed action, cultural resources would most likely not sustain any direct or indirect adverse effect. Project design elements are in place to protect identified archaeological resources from the direct effects of mechanical disturbance and fire-related damage. Secondary effects of mechanical disturbance, such as erosion of site deposits, would likewise be avoided through the observation of project design elements. Implementation of prescribed burning treatments would pose some risk to built resources or other fire-sensitive cultural resources.

In the long term, cultural resources in the planning area would benefit from landscape scale fuels reduction treatments as archaeological resources and built historic resources would become less likely to sustain damage from a severe wildfire event and fire suppression activities. This positive effect would be cumulative with the effects of other past, present, and future projects in the Resource Area that would reduce the threat of stand replacement wildfire.

B. Proposed Action: Noncritical Elements

1. Soils

Minor increases in soil erosion could occur the first couple of years after the project is implemented. Increases in surface erosion would be short-lived. Response of residual understory plants would reduce soil movement. Ground-based mechanized thinning treatments can result in localized compaction or displacement of soil along skidding routes and at the site of large piles. Prescribed underburn treatments are not expected to have a detrimental effect on the soil resource. Spring underburns do not result in wide scale compaction or displacement of soil. Surface erosion could slightly accelerate on burned slopes within the first couple of years after ignition of a prescribed burn. However, spring burns are designed to retain some understory vegetation and litter, which should provide a buffer area that would prevent delivery of sediment to streams.

## 2. Vegetation

Under the proposed action, the influence of encroaching western juniper and other conifers (ponderosa pine and Douglas-fir) on native plant communities in the planning area would be reduced. Overall species diversity would increase following the prescribed fire and mechanical treatments as described in the proposed action.

Removal of juniper and other overstory conifers by cutting would make more resources (sunlight, water, nitrogen) available to residual understory shrubs, grasses, and forbs. Following a lag period of approximately 5 years, a rapid increase in understory cover and density can be expected (Rose and Eddleman, 1994; Vitkus and Eddleman, 1991). Removing a western juniper overstory with mechanized treatments can result in an understory species density that is 10 to 20 times greater than that of untreated areas within 5 years (Bates, et al., 2000). Though grasses and forbs typically respond more rapidly to cutting treatments than shrubs (especially sagebrush), reproductive abilities of shrubs are likely to increase following cutting due to increases in available resources.

The prescribed fire treatment described in the proposed action would have slightly different effects on vegetation in the planning area. Underburning would remove much of the aboveground portions of understory vegetation. However, most plants present in the existing plant communities are adapted to periodic fire and have the capability to respond positively to the disturbance (Miller and Rose, 1999; Miller and Tausch, 2001; Heyerdahl, 2001). Most of the plant species associated with the communities sprout from subsurface structures. Plants that sprout from below ground would recover from burning much quicker than those that establish from seed.

## 3. Wildlife

Overall there is likely to be an increase in wildlife species diversity as a result of implementing the proposed action. The strategically placed juniper cuts, conifer thinning treatments, and underburns would create a diversity of habitats within the project areas. These actions would reduce juniper and pine encroachment, and cause an increase in grasses, forbs, and herbaceous browse species. These treatments are likely to increase the health, vigor, and palatability of winter forage for both deer and elk. In areas such as juniper woodlands and dense pine stands, the quantity of winter forage browse species is expected to increase as well.

The protection and enhancement of mountain mahogany and aspen stands would also benefit deer and elk, as well as many other wildlife species. There would be a short-term loss of aspen habitats for big game species if the aspen stands require a protective fence. Thermal and hiding cover would decrease as a result of the proposed action, but there would still be more than sufficient thermal and hiding cover in the project areas. Species utilizing more open habitats would be favored as a result of the proposed action. Species favoring juniper woodlands and dense conifer stands would be negatively impacted by the proposed action.

4. Fisheries

Impacts of the proposed action on fisheries would be the same as those impacts of the proposed action on Special Status aquatic species mentioned above.

5. Rangeland Management

All portions of the proposed action that deal with the removal of large woody species such as western juniper, ponderosa pine, and Douglas-fir would increase available soil moisture and release nutrients for the increased production of herbaceous species. The increase in herbaceous species would improve livestock distribution thereby reducing concentrations of livestock on any given area, and may decrease overall utilization levels. Livestock in the short term would tend to congregate on any area of disturbance, especially areas that are treated with prescribed fire. Most of these areas within the proposed project site are rarely accessed by livestock during their normal grazing activities.

6. Recreation

Under the proposed action there may be brief minimal impacts to recreational activities in the vicinity of the planning area. Smoke and noise generated during project implementation could disrupt recreational activities in the spring or fall seasons. In the long term, recreational activities related to driving for pleasure, big game hunting, and wildlife viewing would be enhanced as habitat function improves over time.

7. Visual Resource Management

The proposed action meets management direction outlined in the Three Rivers RMP for VRM Classes III and IV. Visual resources would be temporarily affected with short-term impacts while treatments are taking place. Upon completion of the project long-term benefits to visual resources should be enhanced as the regeneration of deciduous shrubs and trees take place and overall diversity increases.

8. Economic and Social

There would be short-term positive impacts to local economy under the proposed action. The proposed action would utilize stewardship or service contracts to reduce biomass in the planning area. The purchase of supplies and equipment necessary for implementation of the proposed action from community merchants would constitute an additional positive economic effect.

9. Forestry

Within the ponderosa pine woodland areas:

Stocking of invaded western juniper would decrease to be more in line with historical levels. Small and medium sized ponderosa pine stocking would be reduced substantially. The pines that remain would have increased vigor and be more able to withstand natural disturbance processes such as fire and insect attack. Mountain big sagebrush/bunchgrasses, mountain mahogany, bitterbrush, and other upland vegetation would benefit from the decreased stocking of trees. Ponderosa pine would exist in a level more characteristic of the historical pine woodland, with scattered large diameter pines with some other sizes dispersed through the sagebrush/bunchgrass community.

Within the ponderosa pine and Douglas-fir forest areas:

The proposed action would restore the character of the stands to near their historic condition. The overstory would continue to consist of large diameter ponderosa pines with some large Douglas-fir in the moister areas. The character of the understory would substantially change as the basal area would be greatly reduced. Overall stand character would be more open and park-like with clumps of big trees and scattered understory reproduction. Both the overstory and the trees that remain in the understory would grow faster and more vigorously and result in better overall stand health. All treated stands would be more resilient to natural disturbance processes such as fire, disease, and insect attack. The ratio of Douglas-fir to ponderosa pine in the understory would be reduced to levels more common to historical conditions. Duff depths would be reduced and with more sunlight and moisture, the ground cover would respond with an increase in quantity and quality of herbaceous and grass species. Aspen stands would respond to the treatments and would reproduce and remain in the project area.

## 10. Fire Management

By treating these areas using the proposed action, the FRCC would move from a Condition Class 3 (high risk of losing key ecosystem components from fire) to a Condition Class 2 or 1 (a moderate to low risk of losing key ecosystem components from fire). The proposed action would lower the risk of stand replacement fire in the project area. Thinning trees would reduce ladder fuels and the chance of fire going from the surface to the crowns. The stand would be less dense and the ladder fuel component would be removed. Fuel loadings and the intensity and severity of a wildfire would also decrease. Treating the slash by piling and burning removes the heavy accumulations of fuel, reducing the rate and intensity of surface fire spread. A short-term increase in fire danger would occur until the slash is piled and burnt. It would take between 1 to 3 years to cure the piles. After initial treatments are complete, underburning of the units would be conducted to maintain densities and fuel build up. Reintroduction of fire into the ecosystem would prune some of the lower branches of the trees and reduce duff levels.

## 11. Realty

The proposed action would significantly reduce the risk of intense wildfires occurring with extreme rates of spread on the project area. Consequently, the proposed action would reduce the risk of fire entering the private property via land administered by the BLM. The private property within the project area and in the general vicinity would have some minor short-term negative effects as a result of implementing the proposed action. The private property in the general vicinity of the project area is likely to experience short-term smoke inundations. The smoke would dissipate within a few days of burning.

### C. Proposed Action: Cumulative Effects

At a Resource Area scale, the effects of juniper removal, pine and fir thinning, and prescribed underburning described in the proposed action could be considered cumulative with the effects of previous and reasonably foreseeable vegetation management projects implemented in the Three Rivers Resource Area.

The proposed action, in concert with juniper control efforts such as the Three Rivers Juniper Management Project (EA OR-025-00-04) and Devine Ridge/Forks of Poison Creek Vegetation Management Project (EA OR-025-04-044), will incrementally reduce the influence of western juniper on mountain big sagebrush/bunchgrass communities, quaking aspen, and mountain mahogany in the Resource Area.

The proposed action would also combine with the effects of past, present and reasonably foreseeable forestry projects, such as SHED Forest Restoration Project (EA OR-025-04-038) and West Silvies Valley Prescribed Burn (EA OR-025-01-25), to incrementally improve forest health, reduce fuel loading, and alter stand structure in ponderosa pine and Douglas-fir stands in the Three Rivers Resource Area. Risks to human safety, private property, critical infrastructure, and functional fire-adapted ecosystems associated with stand replacement wildfire would decrease in corresponding increments.

The proposed action includes project design elements developed to avoid damage of fisheries, Special Status species habitat, cavity-nesting bird habitat, big game cover and forage values, cultural resources, and economic and social values. Project design elements would reduce effects related to loss of soil productivity and sedimentation of water sources to levels that are immeasurable at a watershed scale. Effects of smoke on air quality would be short lived. Therefore, the cumulative potential effects on these resources are likely to be either beneficial or benign.

D. No Action Alternative: Critical Elements

1. Air Quality

There would be no direct effect to air quality under the no action alternative. However, there would be short-term negative effects on air quality in the event of a large-scale wildfire.

2. Water Quality

There would be no change to current water quality under this alternative. However, water quality impacts could be severe if the area was impacted by a major wildfire event. The increased risk of turbidity, sedimentation, and degradation of water quality exists with the increased risk of a high intensity wildfire.

3. Wetlands and Riparian

There would be no change to the current riparian and wetland characteristics under this alternative. However, with continued fuel loading in the project area the chance of a high severity fire outbreak is increased. In this event, there could be excess sediment delivered to the riparian zone. An excessive sediment load could lead to a short-term loss of riparian vegetation. Aspen stands would continue to deteriorate and the riparian vegetation composition would continue to move farther away from its historical range.

Also, there would be no fencing created or repaired under this alternative. Trespass grazing could deteriorate riparian areas along the lower portion of Lake Creek. Riparian degradation reduces the capacity of riparian features to act as natural fire breaks.

4. Migratory Birds

Under the no action alternative, no disturbance to migratory birds would occur due to human activity. Plant communities would continue to transition toward juniper woodlands and overstocked conifer stands, with reduced herbaceous understories. When western juniper density and cover increase to the point that shrub and herbaceous understory are suppressed, avian species diversity decreases (Reinkensmeyer and Miller, 2000). Avian species diversity is also likely to decrease as conifer stands continue to increase in basal area. Mountain mahogany and aspen stands would also continue to be encroached upon and outcompeted by juniper and pine trees, which would likely lead to the eventual loss of these habitats. A loss of these habitats would also lead to a loss in avian species diversity. This alternative would favor the relatively few species that prefer juniper woodlands and densely overstocked conifer stands. Overall, the net effect of the no action alternative is likely to be a decrease in avian species diversity.

5. Threatened, Endangered, and Special Status Species - Flora

There are no known effects to Threatened or Endangered plant species under this alternative. The no action alternative would have no known effects on dwarf lousewort unless a high intensity wildfire occurs. A high intensity wildfire could reduce dwarf lousewort populations in the project area.

6. Threatened, Endangered, and Special Status Species - Fauna

a. Terrestrial Species

There are no known effects to Threatened or Endangered wildlife species under this alternative. The no action alternative would have effects on sage-grouse, northern goshawks, and their habitats. There would be no effects on sage-grouse and northern goshawks as a result of human actions.

Areas of historic sage-grouse habitat, but currently not due to juniper encroachment, would remain as nonhabitat for sage-grouse. As juniper encroachment continues areas of existing sage-grouse habitat would experience a decrease in herbaceous cover and an increase in predatory raptor perches. Eventually these areas are also likely to become classified as areas of nonhabitat for sage-grouse habitat.

This alternative would not affect the northern goshawks, or the habitat they use in these areas unless a wildfire burns through the area. A high intensity wildfire would have devastating effects on their habitat.

b. Aquatic Species

There are no known effects to Threatened or Endangered fish species under this alternative. This alternative would not impact Special Status fish fauna. However, with continued fuel loading in the project area the chance of a high severity fire outbreak is increased. In this event, there could be excess sediment delivered to the riparian zone. An excessive sediment load could be detrimental to redband trout and Malheur mottled sculpin.

7. Noxious Weeds

There would be no change in the risk of introduction of new weed populations or the expansion of existing weed populations due to human activity. The risk of noxious weed invasion would increase as fuels accumulate and the likelihood of a large scale wildfire increases. Wildfires that occur in these communities with excessive fuel loading tend to be severe enough to kill large tracts of vegetation. These conditions are conducive to noxious weed invasion.

8. Cultural Heritage

Under the no action alternative, there would be no direct effect on cultural resources identified in the Lake Creek/Boone Canyon project area as no fuels reduction, aspen enhancement, or rangeland improvement activities would be implemented. However, with no implementation of fuels reduction activities, archaeological and architectural resources would continue to be in jeopardy of damage or destruction by high intensity wildfire.

E. No Action Alternative: Noncritical Elements

1. Soils

Under the no action alternative, no additional soil compaction, disturbance or erosion would occur from human activity. The risk of soil damage and heavy erosion following a high intensity wildfire would increase as fuel loads continue to accumulate over time. Increasing western juniper density and cover would also result in increased soil surface exposure.

2. Vegetation

Under the no action alternative the continuation of the trends in the listed plant communities would continue to be unchecked. Human intervention in the natural systems has been a factor contributing to a less than natural condition. Under the no action alternative large-scale stand replacing fires in areas where conifer encroachment has occurred would likely increase. High intensity wildfires combined with a continuing loss of herbaceous understory would continue to be a factor or factors contributing to a landscape level conversion of historic plant communities.

3. Wildlife

Under the no action alternative, no disturbance to wildlife would occur due to human activities. Plant communities would continue to transition toward juniper woodlands and overstocked conifer stands with reduced herbaceous understories. Browse species (bitterbrush, big sagebrush, chokecherry, etc.) that elk and deer rely upon in the winter would continue to decrease in quantity, health and vigor, and palatability. Mountain mahogany and aspen stands would also continue to be encroached upon and outcompeted by juniper and pine trees, which would likely lead to the eventual loss of these habitats. This would cause a decrease in habitat quality for big game species as well as several bird and small mammal species which utilize these habitats. Thermal and hiding cover would increase under this alternative if a stand replacing wildfire did not occur.

4. Fisheries

There are no known effects to fisheries under this alternative. This alternative would not impact any fish species due to human activity. However, with continued fuel loading in the project area the chance of a high severity fire outbreak is increased. In this event, there could be excess sediment delivered to the riparian zone. An excessive sediment load could be detrimental to many fish species occurring in the area.

5. Rangeland Management

Upland trend photos over the last 10 years show a marked increase in western juniper on many of the upland mountain big sagebrush communities with a corresponding decrease in shrub and grass cover. Over time as grass species decline in abundance, there is increased use by livestock on the remaining plants. As the remaining plants decrease in vigor, there are more nutrients available for tree species and the downward cycle continues without reductions in livestock use. The no action alternative also leaves open the opportunity for heavy buildup of large woody fuel and the chance for intense wildfire. These intense wildfires can completely kill grass species that would not be killed under more moderate fuel loads. Livestock reductions would need to more extreme after intense wildfires.

6. Recreation

There would be no direct effect to recreational activities under this alternative. Under the no action alternative there are likely to be brief disruptions to recreational activities in the vicinity of the planning area from fire suppression and smoke during the summer and fall seasons. A stand replacing fire would have major effects on future recreation.

7. Visual Resource Management

There would be no effects anticipated to visual resources under the no action alternative in the short term unless a major wildfire event occurred in the area. A major wildfire event would drastically change the visual resources in the project area. In the long term, visual resources would be negatively affected due to the loss of diversity of plant communities and structure on the landscape.

8. Economic and Social

There would be no change to social and economic aspects of this area under this alternative. Under the no action alternative no service or stewardship contracts would be granted and no supplies would be purchased for the purpose of project implementation.

9. Forestry

Implementation of the no action alternative would have a continued negative impact on the stands. The large diameter ponderosa pine and Douglas-fir trees in the overstory would continue to die from western pine beetle and pine engraver attack and not be replaced by other medium to large trees (Cochran, 1994).

The ponderosa pine and Douglas-fir understory would remain stagnant with a slow growth rate while continuing to suffer pockets of heavy mortality from mountain pine beetle and pine engraver (Obiedzinski and others, 1999). Overall, tree vigor would remain low, mortality high, and the large diameter ponderosa pine and Douglas-fir component would be diminished and not replaced for decades, assuming the project area does not experience a stand replacing wildfire.

The remnant aspen stands would continue to suffer mortality from being overtopped by invaded juniper, ponderosa pine, and Douglas-fir (Wall, et al., 2000). The few aspen suckers would continue to be heavily browsed and the aspen clones would face eventual stand death. It is highly likely that any wildfire would become an unnatural stand replacement fire, destroying valuable habitats and vegetative resources.

10. Fire Management

*Ponderosa Pine and Douglas-fir Forest*

Under this alternative no fuels treatments would occur. Fuel loading and tree densities would continue to increase, thus increasing the threat of a stand replacing fire. A wildfire in these stands with the existing fuel loads would have a high probability of being stand replacing. Severe wildfires damage soils, watersheds, critical fish and wildlife habitat, timber, and other infrastructure. Firefighters would be placed at risk as fuel loads are high and subsequent fire behavior increased.

*Mountain Big Sagebrush/Bunchgrass Communities*

Juniper removal would not occur in these areas under the no action alternative. These communities would continue on a predicted successional transition to fully developed juniper-woodlands (Miller, et al., 1996). Juniper woodlands would continue to develop and become more fire-resistant in the short term. The current path of succession under fire exclusion also indicates a likely decline in water quality, vegetative cover, and litter. Increased bare ground promotes the vulnerability to accelerated erosion, site instability, and decreased watershed function. It would take extreme fire conditions to carry fire through the area and the resulting fire effects are high, thus, fire severity and intensity would be greatly increased. Fires would remove overstory, but there would be little to no understory plants to respond. This also increases the risk of noxious weed establishment. Firefighters would be placed at risk as fuel loads are high and subsequent fire behavior increased.

11. Realty

Under the no action alternative there would be no impacts to private property as a result of human disturbance. The risk of an intense wildfire occurring within the project area and carrying onto private property would remain high and increase as fuel loads continue to build up.

F. No Action Alternative: Cumulative Impacts

The effects under the no action alternative within the current planning area would be cumulative with no action effects on other landscapes in the vicinity of the Lake Creek/Boone Canyon planning area. The effect of forested areas becoming overstocked and at high risk for catastrophic wildfire on private property, human safety, wildlife habitat, aquatic resources, cultural resources, livestock grazing, and Special Status species may be cumulative with the effects of overstocked forests with high risk of catastrophic wildfire on other landscapes in the region. In addition, the effect of the transition of mountain big sagebrush/bunchgrass communities to juniper woodlands on wildlife habitat, aquatic resources, cultural resources, livestock grazing, and Special Status species may be cumulative with the effects of juniper woodland development on other landscapes in the region. Accumulations of hazardous fuel in the planning area, in combination with other hazardous fuels on adjacent BLM-administered and private lands, would increasingly threaten resource values, private property values, and human safety over time.

CHAPTER V. CONSULTATION AND COORDINATION

A. Agencies and Individuals Consulted

Burns Paiute Tribe  
Royce Dotson  
Rick Elliott  
Grant County Court  
Harney County Court  
Harney County Watershed Council  
Harney Soil and Water Conservation District  
Todd Hueckman  
Betty Morgan  
Oregon Department of Fish and Wildlife  
Southeast Oregon Resource Advisory Council  
Tony Urizar  
U.S. Forest Service: Malheur National Forest, Emigrant Creek Ranger District  
Justus Watson

B. Adjacent Private Landowners and Permittees Contacted

Mark Doverspike  
Raymond Feichtmeir  
Don Johnson  
Tom Pettyjohn  
Robert Smith  
Gary Waggoner

C. Participating BLM Employees

Bill Andersen, Rangeland Management Specialist  
Lindsay Aschim, Fisheries Biologist/Aquatic Specialist  
Jim Buchanan, Supervisory Natural Resource Specialist  
Angie Foster, Fuels Planner  
Gary Foulkes, District Planning/Environmental Coordinator  
Doug Linn, Fire Botanist  
Fred McDonald, Natural Resource Specialist-Recreation  
Nick Miller, Wildlife Biologist, Interdisciplinary Team Leader  
Skip Renschler, Realty Specialist  
Jon Reponen, Forestry Specialist  
Lesley Richman, Weed Specialist  
Dan Ridenhour, Fuels Planner  
Jeff Rose, Fire Ecologist  
Don Rotell, Fire Archaeologist  
Joan Suther, Three Rivers Resource Area Field Manager  
Fred Taylor, Wildlife Biologist

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