

Key Issue #2: Treaty Resources and Other Concerns of the Klamath Tribes

The Forest Service recognizes the Klamath Tribes right to hunt, fish, gather plants, and trap on former reservation lands. The Klamath Tribes believe that, in addition to hunting, fishing, plant gathering, and trapping, other treaty resources are included under the Treaty of 1864. The Klamath Tribes have indicated in past appeals and consultation that a natural appearing landscape was another Treaty resource. Other issues raised by the Tribes Culture and Heritage and Natural Resources Departments are effects on living culture and cultural site protection, and concern for a variety of wildlife species and traditional use plants.

The first portion of this section (Big Game Habitat) will address the following item related to Key Issue #2:

- Display of the effects of treatments on mule deer habitat, a primary Treaty Resource concern of many Tribal members.

The next portion of this section (Stand Appearance) will address the following item related to Key Issue #2:

- Discussion of the visual effects of the treatments on a natural appearing landscape.

The third portion of this section (Heritage Resources) will address:

- Discussion of cultural site protection measures to avoid disturbance by treatment activities.

The final portion of this section (Species of Interest) will address:

- The effects of treatments on wildlife species of interest to the Tribes and on traditional use plants.

Big Game Habitat

Current Condition

Mule deer are an important Treaty Resource for many Tribal members. There are also occasional sightings of elk in the Ninemile Project Area, but due to the proximity of populated areas they are not usually resident and elk habitat is not a primary concern within the project boundary. The project area is split between deer summer range to the west and winter range to the east.

The current condition for the Ninemile Area is shown in Figure 3-10. The area analyzed as winter range is labeled on the map as “Mule Deer Winter Range”, and includes the Management Area 10 (MA 10) Big Game Winter Range lands and the associated riparian areas (MA-8) and scenic (MA-3) areas within the gross area. The summer

range is labeled “General Forest” on the map, and includes Timber Management lands (MA-12) and the riparian, scenic, and old-growth ecosystem (MA-7) areas within this larger mapping designation. Approximately 10948 acres fall into the Winter Range category in Ninemile. The remaining 7458 acres are in the Summer Range or General Forest category.

Standards and Guidelines for Big Game Winter Range (Management Area 10) in the Winema LRMP state that no less than 20% of the winter range shall be in a thermal cover condition with a minimum of 30% of the area as cover (thermal and/or hiding). Fifty percent total cover is the desired condition in MA 10 to manage toward. Two-thirds of this cover should be in thermal cover. Hiding cover shall be retained or developed where site potential allows, so that natural or created openings greater than 600 feet in width are minimized. Over the long term, the quantity of forage available to deer and the quality of forage available shall not be less than the current conditions.

Human activities shall be discouraged or minimized, and management shall be for reduced winter access on deer winter ranges from November 15 through July 15 to prevent disturbance of wintering and fawning mule deer. Traffic shall be limited to designated open roads. Off-road vehicle use is prohibited during the specified closure season. Non-motorized use is acceptable to provide access for subsistence hunters and for winter surveys. Timber harvest shall be programmed, and even-aged and uneven-aged forest management may be used.

Standards and Guidelines for the Summer Range or General Forest area in the Winema LRMP state that vegetative cover and forest access will be managed to reduce the effects of harassment and to improve use of the forest by mule deer. Both hiding cover and limited visual screening will be used to reduce harassment. The Forest shall provide a minimum of 30% of its area as cover for deer. Generally, 15% of the area will be hiding cover, 10% will be thermal cover, and 5% will be cover for fawning if available. Whenever possible, all cover also will be hiding cover.

The improvement of forage for mule deer will be emphasized as rapidly as possible, consistent with other land use objectives. The desired short-term forage composition is grasses and forbs with a limited shrub component. To provide adequate diversity of forage structure for deer, activities shall be planned to achieve multiple age classes in the brush vegetative component.

The federal land in the project area as a whole contains about 40% forage and 60% cover. Forage quality on federal land is quite low, and the area classified as forage is much lower than the desired condition in the Winema LRMP. Much of both the forage and cover is produced by decadent bitterbrush, which is not as palatable or nutritious as younger bitterbrush, and is a primary source of ladder fuels due to dead limbs. Privately owned meadows and pastures within the project area also provide additional, high quality foraging opportunities.

Within the Winter Range portion of Ninemile there is currently 55% cover and 45% forage. The Summer Range has 69% cover and 31% forage. Cover is far higher than the desired levels in the Winema LRMP. The cover/forage values for the entire Ninemile Area, the Winter Range, and the Summer Range are shown in Table 3-9. The quality of the forage is poor across the entire Project Area, with the exception of the

Lone Pine Fire. Vegetative dominance by conifers and the absence of fire disturbance for decades has resulted in older, decadent brush as the main big game forage available. Grasses and forbs are reduced or absent from most conifer sites. Mountain mahogany, while plentiful, is in many areas too tall for browsing deer to reach. Aspen and willows have been encroached by conifers and are in decline. The Lone Pine Fire area is currently producing good quality and quantities of big game forage.

Table 3-9. Ninemile Project Area Cover / Forage Current Condition

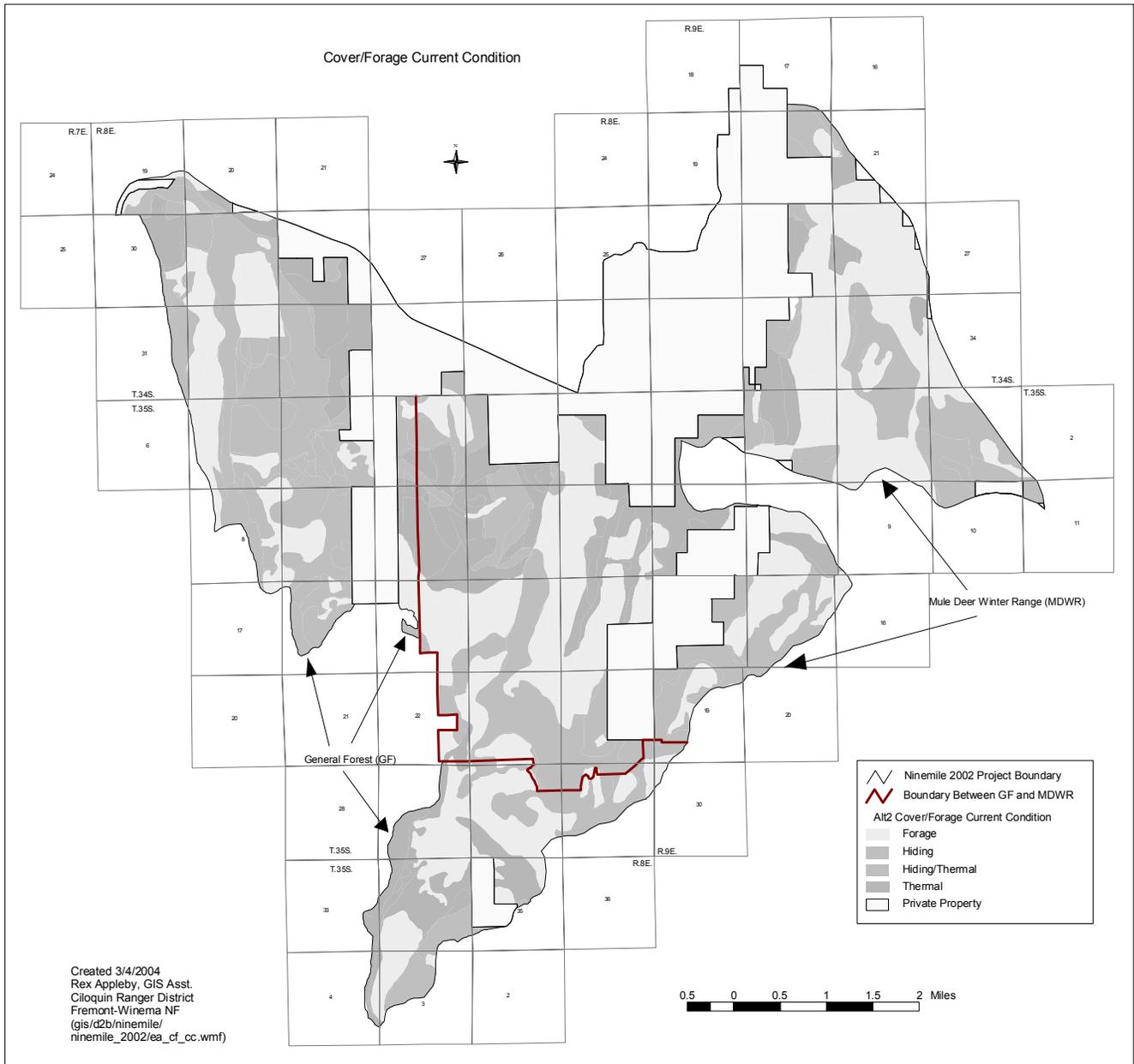
Ninemile Project Area Total Cover/Forage					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	7339	11103	683	3524	6896
Percent	40	60	4	19	37
Ninemile Winter Range Cover/Forage					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	5010	5974	0	2055	3919
Percent	45	55	0	19	36
Ninemile Summer Range Cover/Forage					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	2329	5129	683	1469	2977
Percent	31	69	9	20	40

Alternative 1 No Action

With the no action alternative, tree canopy cover will continue to increase and understory forage production to decrease. Overall, habitat conditions will continue to decline. The area would support fewer big game animals in the future. There will be no short-term loss of forage from reintroduction of fire. The benefits of prescribed fire that create new brush growth and age-class distribution would also be lost. The long term consequence of continuing to exclude disturbance to the ground cover community is the loss of quantity and quality forage from the aging process and from tree competition. Grasses and forbs will continue to be absent or present at much lower levels than with regular fire disturbance. Wholesale loss of cover and tree canopy will occur in the event of a wildfire burning through the area, reducing the majority of the habitat to early seral conditions with no hiding or thermal cover and few seed sources for regenerating browse species.

Planted trees in Lone Pine are beginning to grow above the shrub layer, and will soon

Figure 3-10. Ninemile Project Area Current Cover/Forage Condition



capture the available site resources now going to forage production. Forage will decline over the next ten to twenty years. The Lone Pine Fire area will develop into hiding cover within ten years, adding about 9% to the total hiding cover for the Winter Range side of Ninemile.

Alternative 2 Proposed Action

Restoration of more open habitat will help reverse the declining habitat trend of increased canopy closure and reduced forage production. Forage improvement would eventually support a larger deer population. Cover will be reduced in both the Summer and Winter Range portions of Ninemile. The effects of the proposed action on cover/forage immediately after completing proposed activities is shown in Table 3-10 and Figure 3-11 for the entire area, the Winter Range, and the Summer Range.

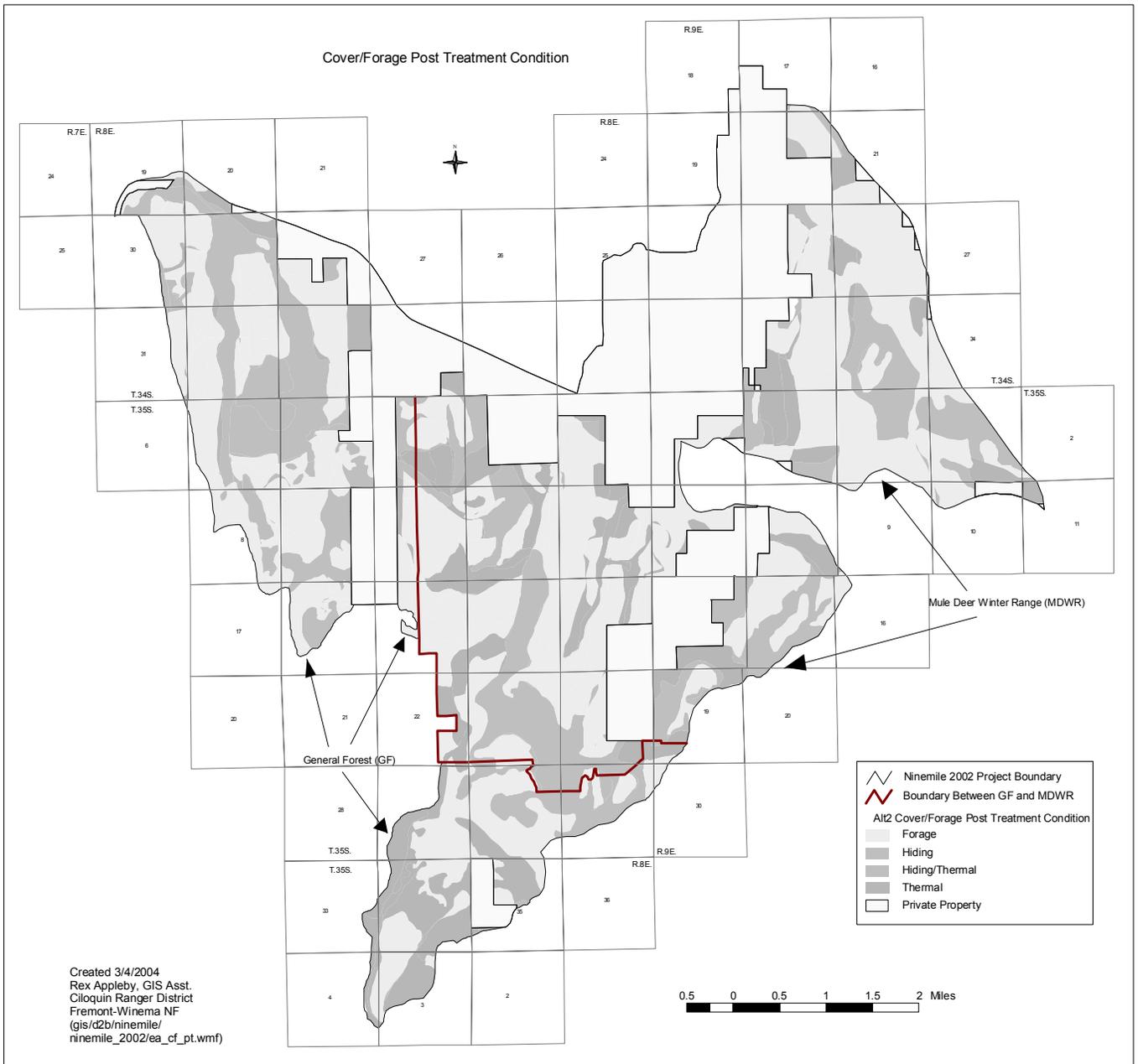
Table 3-10. Ninemile Project Area Cover / Forage Post Treatment

Ninemile Total Cover/Forage Post Treatment					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	10383	8059	577	3154	4328
Percent	56%	44%	3%	17%	24%
Ninemile Winter Range Cover/Forage Post Treatment					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	6431	4553	0	1973	2580
Percent	58%	42%	0%	18%	24%
Ninemile Summer Range Cover/Forage Post Treatment					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	3952	3506	577	1181	1748
Percent	53%	47%	8%	16%	23%

The effects on the cover and forage are also evaluated for ten years after completion of the proposed action. These effects are shown in Table 3-11 and Figure 3-12 for the entire area, the Winter Range, and the Summer Range.

The Winema LRMP desired condition for mule deer winter range is for fifty percent total cover, of which 2/3 is thermal cover. After treatment, in the short term (≤ 10 years), the 10984 acres of mule deer winter range in the Ninemile Project will consist of 58% forage and 42% cover. The cover will consist of stands that are thermal cover alone, and patches providing both hiding and thermal cover. Forage quality will be improved within the treated areas through a change from decadent, inedible brush conditions to

Figure 3-11. Ninemile Cover / Forage Post Treatment



younger, more palatable and nutritious plants. There will be a short term reduction in forage production the year after underburning, followed by an increase in forb and grass production.

In the long term (> 10 years), the mule deer winter range within the Ninemile Project will consist of 50% forage and 50% cover, including 83% of the cover that provides thermal protection. There will be an increase in the quantity of hiding cover on the east side of Ninemile, as the Lone Pine Fire area increases in age. These cover/forage numbers compare favorably with the requirements in the Winema LRMP.

Table 3-11. Ninemile Project Area Cover / Forage Post Treatment plus Ten Years

Ninemile Total Cover/Forage Post Treatment Plus Ten Years					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	9484	8958	1517	3113	4328
Percent	51%	49%	8%	17%	24%
Ninemile Winter Range Cover/Forage Post Treatment Plus Ten Years					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	5532	5452	940	1932	2580
Percent	50%	50%	9%	18%	23%
Ninemile Summer Range Cover/Forage Post Treatment Plus Ten Years					
	Total Forage	Total Cover	Cover Category		
			Hiding	Thermal	Hiding and Thermal
Acres	3952	3506	577	1181	1748
Percent	53%	47%	8%	16%	23%

The Winema LRMP requirements for mule deer summer range state that the Forest shall provide a minimum of 30% of its area as cover for deer, with the short term goal of producing grasses and forbs with a limited shrub component. In addition, to provide diversity of forage structure, activities shall be planned to achieve multiple age classes in the brush vegetative component.

After treatment in the proposed action, the mule deer summer range will consist of 53% forage and 47% cover, which more than meets the cover requirements stated in the Winema LRMP. The effects on the treated areas will remain for more than 10 years.

The Ninemile Project fuels reduction changes an overstocked forested ecosystem with unpalatable, decadent brush into a younger age class condition more closely resembling the open habitat requirements for both mule deer and elk summer range, as described in both the Winema LRMP and in other sources listed in the Current Condition section. A total of 48% of the project area is being treated, and treatments

within the proposed units will be done in a mosaic pattern that leave up to 30% of the bitterbrush and 10% of the stands untreated. The Ninemile Project also meets the LRMP standards for creating multiple age classes within the brush component.

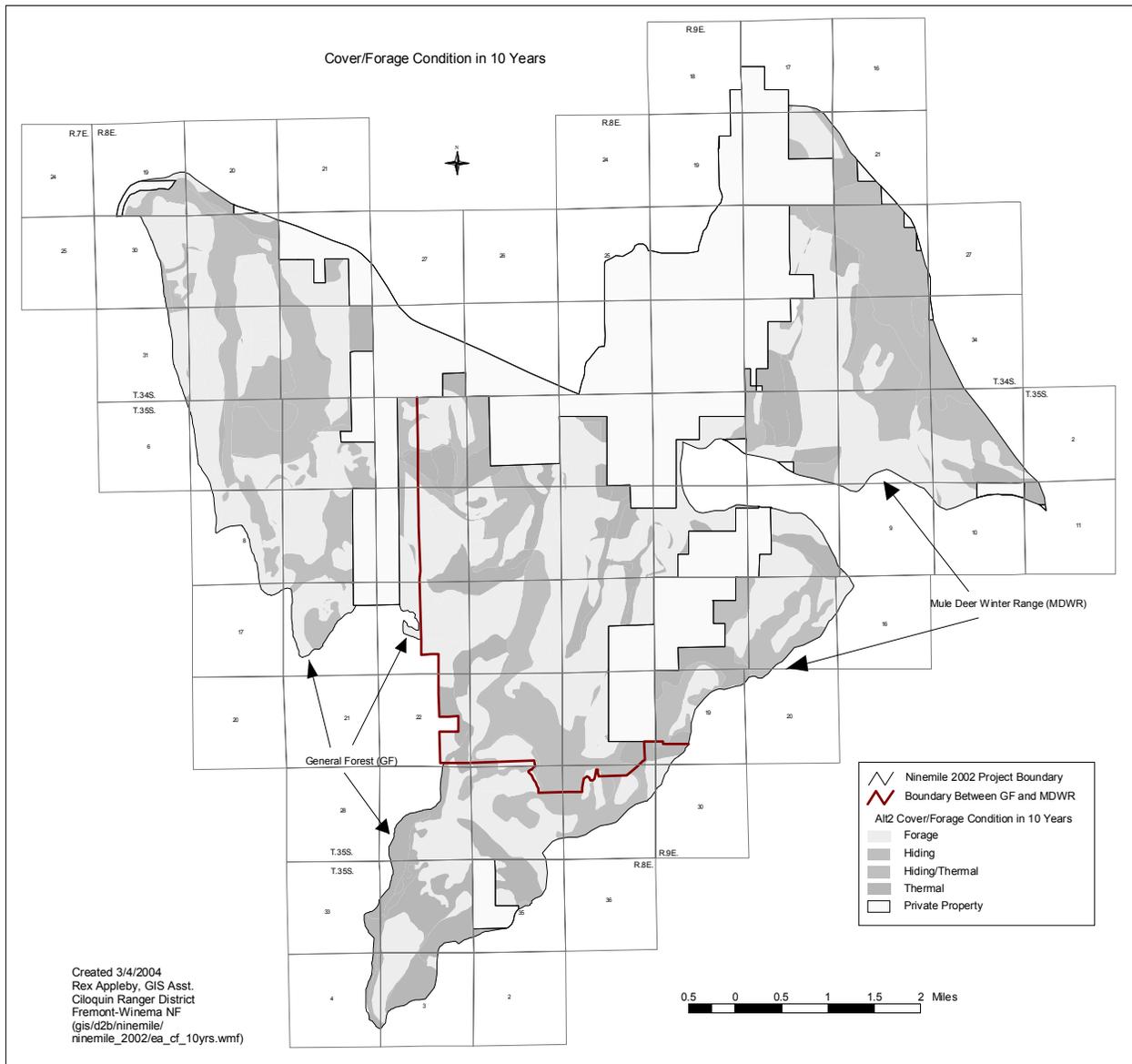
Cumulative Effects

The cumulative effects of forage improvement through opening tree canopies and decadent brush reduction over the Chiloquin Community Fuels Reduction, Ninemile, Ninemile North and the Lone Pine Fire areas are that the larger area can probably support a larger big game population as forage quantity and quality have been improved or will improve over conditions prior to the fire and treatments. The effects on cover will only be short term. Hiding cover is already available in much of the Lone Pine Fire area, eleven years later.

An offsetting factor to the increase in forage production on Forest Service lands utilized for deer and elk transition and summer range is the condition of their winter range. Most of the big game winter range is in the valley bottoms, which have been largely converted to farms and houses.

The Forest Service does not have jurisdiction or control over the quantity of individual deer or elk harvested within its boundaries. Harvest limits are set by the Klamath Tribes' Games Commission and by the Oregon Department of Fish and Wildlife.

Figure 3-12. Ninemile Cover / Forage Post Treatment plus Ten Years



Visual Effects/Natural Appearing Landscape

Aspects of living culture identified by the Klamath Tribal representatives in the past include hunting practices, traditional plant gathering areas, religious practices, road access, and aesthetic and visual quality. The Klamath Tribes disclosed no specific information on trapping or fishing areas within Ninemile. Direct or indirect effects to trapping or fishing are not expected from any action alternative. The Klamath Tribes disclosed no specific information on plant gathering areas within the project area.

Visual quality can be a different perception for each individual and their personal views of the landscape. The Rosie Timber Sale, appealed by the Klamath Tribes, can be used as an example to further highlight the complexity of analyzing effects. In the Klamath Tribes appeal of the Rosie Timber Sale (Klamath Tribes 1992) the Tribes cited their living culture, which include visual quality. The following is an excerpt from the Klamath Tribes appeal of the Rosie Timber Sale:

"Any impacts on visual appearance/scenic qualities are components of the evaluation of the ethnographic landscape and can only be analyzed by an environmental perception study involving a cross-section of tribal members. This study, as part of the social impact assessment, must address implications for traditional religious practices of the members of the Klamath Tribes and the potential impact on physical and mental health. The impact to natural resources has a socio-cultural side among the Klamath culture that is closely intertwined with religious practices and personal group sense of identity and well-being. The maintenance of large areas of old-growth and natural appearing forest is a major component of the baseline perception of the ethnographic landscape against which change must be measured to determine impact. To say that visual effects of harvest are temporary does not address the social and psychological effects on the living culture."

The appearance of the landscape and the change in appearance due to planned activities are important issues for some Tribal members. The perception of the appearance of the existing landscape and the proposed changes as positive or negative varies with each individual. The perception also varies over time as vegetation recovers following treatment or following a wildfire. The visual appearance and differences between alternatives is described below. The current stand condition is also discussed in the Silvicultural section of Key Issue #1 above.

Current Condition Ponderosa Pine and Pine Associated Stands

The majority of the pine and pine associated stands proposed for treatment appear as multi-layered dense stands with a component of large diameter ponderosa pine. Often the pine understory is so thick that larger trees are hidden from view by the understory vegetation. Some small openings occur, and these are usually occupied by bitterbrush, or manzanita and Ceanothus at higher elevations. In dense conifer areas, shrub species are greatly reduced in amount and vigor, or may be absent entirely. Older past harvest activities are generally not evident due to the amount of vegetation present, and the length of time that has passed since the older harvest activities occurred.

Some of the pine and pine associated stands have been affected in their appearance by more recent past activities. Since 1980, overstory removal treatments followed by

precommercial thinning have left even-aged stands that are dense and uniformly the same in height and diameter. The stands are at times thick enough to reduce shrubs, grasses and forbs to a very minor amount except in old landings and skid trails. There are also well-stocked pine plantations and heavy brushfields in the Lone Pine Fire area.

Alternative 1 No Action

All stands will continue to increase in density. Insects or other pathogens will kill scattered large and small trees as competition weakens them. This may not be evident visually due to the thickness of some of the stands. Riparian habitats will steadily decline due to the encroaching conifers. Bitterbrush and understory vegetation will steadily decline, which will lower the forage value for big game and increase the fuel loading.

In the long term (10 to 30 years), as stand density increases, tree mortality will increase. The increased mortality will add to the fuel loading, which will decrease forage and hiding cover. Existing old growth would increase in susceptibility to mortality from stand replacing wildfire, insects and disease. Following any large fire, significant portions of this project area will be regenerated either as a brush field or as even-aged stands of young trees. An example of this exists at the northeast portion of the project area where the Lone Pine Fire burned 30000 acres in August of 1992.

Alternative 2 Proposed Action

The treated pine stands will appear more open. There will still be several layers of crowns present, but trees will generally be spaced well apart from other trees. Willows and aspen, where present, will be emphasized by leaving few conifers near the hardwoods and by stimulating these species through fire and mechanical disturbance. Approximately 10% will be left untreated in each stand for wildlife screening and visual diversity. The overall appearance of the treated areas will be of a large diameter pine stand, with many of the large, platy-barked trees fully visible.

All treated areas, including the portions of units that are in Management Area 3, Scenic Management, will meet visual quality objectives (VQO) from the Winema LRMP (p. 4-101 to 4-111). The desired future condition for the most restrictive VQO, MA 3A, Foreground Retention, is the emphasis of large tree character and natural appearing forms, colors, and textures. The restoration of historic stand structures proposed in Ninemile meets this desired condition or moves structures toward the large tree character.

No planting is expected to be necessary in the Ninemile Project Area. The stocking control proposed will open up the treated units. Underburning will remove much of the litter and duff layer and will provide an excellent seedbed for natural regeneration. Ponderosa pine should seed in naturally, and at higher numbers than needed in the future if sustainable stand structure continues to be a goal. Future use of fire in the treated units must be weighed against management direction and resource needs. For sustainable stand conditions to be maintained, periodic light underburning will be needed to control stocking in the natural seedlings that become established and remove the fine fuels that will accumulate. Some areas may be left unburned to develop dense understories for wildlife habitat, similar to the way much of the landscape has developed

under fire suppression now. The periodic light burning will maintain the open appearance of the treated stands as they grow toward late or older successional status.

Units with a large component of older trees will closely resemble the open, park-like conditions dominated by old trees that were prevalent historically. The dense understory conifers will be reduced to scattered individual trees and small groups. Tables 3-12 and 3-13 show the stand structure before and after treatment for two examples of stands containing different levels of large tree stocking.

Table 3-12. Example of Stand Structure Before and After Treatment, Large-Tree Dominated Stand (Unit 01).

Stocking Measure	21"+ DBH	9-21" DBH	4-9" DBH	0-4" DBH	Totals
Existing TPA	17	74	20	200	91 TPA >9", 311 trees total
Existing BA/A	64	60	4	0	128 SQ FT BA/A
Post treatment TPA	17	0	10	10	17 TPA > 9", 37 trees total
Post Treatment BA/A	64	0	0	0	64 SQ FT BA/A retained
TPA = trees per acre DBH = diameter at breast height BA/A = basal area per acre in square feet					

In this stand (Unit 01) it will be possible to meet the desired stocking with all of the large trees. There will be some of the smaller classes represented, because all of the large trees are not evenly distributed. All of the stocking control will be done in the 4 to 21 inch DBH sizes with the commercial sale. Whipfelling will remove most of trees below 4 inches in diameter followed by machine piling of the whipfall concentrations and underburning. This unit will most closely resemble the open, park-like historic pine condition after fuels treatments are completed. The overall appearance will be open, with high crowns, well spaced trees, and little understory vegetation. To maintain this appearance, future entries would include periodic underburning to remove surface fuels and reduce conifer seedlings.

Table 3-13. Example of Stand Structure Before and After Treatment, Multi-layered Stand with Large Trees (Unit 42).

Stocking Measure	21"+ DBH	9-21" DBH	4-9" DBH	0-4" DBH	Totals
Existing TPA	5	108	11	25	113 TPA >9", 149 trees total
Existing BA/A	22	90	1	0	113 SQ FT BA/A
Post treatment TPA	5	32	10	10	37 TPA > 9", 57 trees total
Post Treatment BA/A	22	27	1	0	50 SQ FT BA/A retained
TPA = trees per acre DBH = diameter at breast height BA/A = basal area per acre in square feet					

After treatment, this stand will be a mixture of some larger, older trees, plus about six times as many trees in the 9 to 21 inch DBH range. Some 4 to 9 inch diameter trees will be left to fill stocking holes, but most will be removed with the commercial harvest. The stand will appear more open, especially at the ground level since most of the smaller trees and old brush will be removed. The pine crowns will occur at mid and high levels in the stand, depending on the size and age of the leave trees in each area. This stand will require more commercial entries to achieve the same appearance as Unit 01.

Future entries might include periodic underburning to remove surface fuels and kill new seedlings, and commercial thinning/sanitation harvest in 25 to 30 years as basal area increases and stand growth slows again.

In the even-aged treatment areas, where the larger, older trees were removed in past harvest activities, the appearance after treatment will be an open, small diameter, even-aged pine stand. Thinning will leave a variety of sizes and spacings of the naturally regenerated trees, and will not resemble a plantation derived stand. Shrubs and grasses will quickly develop in response to growing space made available by the tree removal. The trees retained will respond by increasing in height and live crown ratios. Table 3-14 shows the stand structure before and after treatment.

Table 3-14. Example of Stand Structure Before and After Treatment, Second Growth Stand (Unit 46).

Stocking Measure	21"+ DBH	9-21" DBH	4-9" DBH	0-4" DBH	Totals
Existing TPA	0	162	10	25	162 TPA >9", 197 trees total
Existing BA/A	0	120	3	0	123 SQ FT BA/A
Post treatment TPA	0	64	10	10	64 TPA > 9", 84 trees total
Post Treatment BA/A	0	47	3	0	50 SQ FT BA/A retained
TPA = trees per acre DBH = diameter at breast height BA/A = basal area per acre in square feet					

After treatment, Unit 46 will be made entirely of trees from the 9 to 21 inch diameter class. Some 4 to 9 inch trees will be left to fill stocking holes, but most will be removed with the commercial harvest. The stand will appear more open, but with smaller trees and lower crowns than the old growth appearance of Unit 1 above. This stand will take approximately twice as many entries as Unit 42 to achieve the same appearance as Unit 01. Future entries might include periodic underburning (10 to 15 years) to remove surface fuels and kill new seedlings and a commercial thinning/sanitation harvest in 25 to 30 years as basal areas increase and stand growth slows again.

The stands that do not need harvest as part of the fuels treatment generally resemble the post treatment stocking conditions shown in Table 3-14. Most of the stocking is in second growth ponderosa pine. Brush mowing and underburning, and the small amount of precommercial thinning prescribed, will leave these stands more open in appearance, and in need of future entries of thinning and underburning to maintain that appearance.

New natural conifer regeneration is expected in all scenarios described above. The amount of white fir and lodgepole pine will be greatly reduced. Boles of trees will be black and the lower portion of the crowns may be scorched from the fire. Stumps will generally not be evident as mechanical harvesters cut trees within 6 inches of the ground. Skid trails may or may not be evident depending on ground conditions. Skid trails made on snow and frozen ground are less evident than skid trails made during the summer.

The shrub component will initially be reduced through underburning and mechanical treatment. Resprouting from the shrubs is expected the first spring after the

slashbusting/underburning. Grasses and forbs will be present in much larger amounts in the first several years following burning.

Much of the long-term effect on appearance depends on the periodic reapplication of fire. If periodic underburning is continued, the pine stands will increase in diameter and in height and remain fairly open, by reducing brush and natural conifer seedlings. Without periodic underburning pine stands will develop medium to heavy understories of conifers and shrubs, which will increase the fire hazard in the stands. Blackened bark and scorched needles from underburning will exfoliate as trees grow making evidence of burning only apparent upon close examination. At the end of thirty years, without the periodic use of fire, treated stands will appear two-storied to multistoried, resembling the current condition with a larger average overstory and a smaller, younger understory.

Heritage Resources

Current Condition

Cultural Resource inventories were completed in the summers of 1987, 1991, 1992, 1994, 1995, 1997, 1999, 2002 and 2003. A total of 18444 acres have been adequately surveyed, representing nearly 100 percent of the planning area. Surveys were conducted at the intensive survey level, consistent with SHPO standards for 100% coverage, for all potential project impact areas. A total of 162 archaeological sites are located in or within one-half mile of the Ninemile Project Area. Recorded cultural resources include prehistoric residential areas, rock feature-vision quests, lithic scatters, and cambium peeled trees. Historic sites include can dumps, railroad grades, and structures, and primarily reflect activities relating to historic logging. The State Historic Preservation Office (SHPO) concurred that these projects would have no effect on significant cultural resources on October 16, 2003.

Effects to Cultural Resources

Alternative 1 No Action

If the No Action alternative is selected, no ground disturbing activities will occur as planned activities. No impacts would be expected to cultural resources. The fire hazard will not be treated, and the possibility would remain that any wildfire could be a severe, stand replacement event. Such a fire would have the potential to harm some resources (rock features, historic items) and destroy other resources (cambium peeled trees, wooden components of historic sites). Fireline construction, mopup, and other suppression actions in the event of a wildfire could directly impact cultural sites.

Alternative 2 Proposed Action

Heritage resource sites, both prehistoric and historic, are protected from impacts relating to fuels reduction treatments by project design, avoidance, and protection in place. Since the surveys were conducted at an intensive level it is not considered likely that undiscovered sites would be found during project implementation. In the event of an unanticipated discovery during fuels treatment operations, service or timber sale contract provisions that provide for the protection of newly discovered sites will be

enforced. Prior to layout and implementation the archaeologist or a cultural resource technician will be consulted. Reinforcement of site boundaries will take place before operations begin, and will be discussed in prework conferences with contractors, purchasers, Contracting Officer's Representatives, and other personnel as appropriate. Close coordination will be imperative to prevent disturbances to sensitive cultural resource sites.

The Tribes have expressed concern for the protection of archaeological sites, especially those relating to tribal heritage. Archaeological vision quest sites have special significance, as these represent religious practices in the past, as well as the present. Aesthetic and visual quality as viewed from vision quest sites has been discussed with the Tribes. Visual quality and aesthetic value would be maintained for these sites through unit design in relation to the local foreground view from each site. Many sites will be screened from view entirely by vegetation and topography. Protective buffers located around rock feature sites will ensure that trees are not inadvertently felled into sites. This zone will provide a portion of the leave areas for wildlife and enhance wildlife habitat objectives.

Prescribed fire activities have the potential to impact archaeological and historic sites, if allowed to burn within known site boundaries. The primary agents of impact to sites would be fire (burning wooden components of historic sites, thermally altering tin cans or stone tools at lithic scatters), mopup, and line construction.

The District Fuels Technician will consult with the West Zone Archaeologist when site specific burn plans are being prepared. The Fuels Technician and Archaeologist will identify site locations and specific protection measures for each burn plan. Burn plans will address providing adequate buffers for site protection, fireline construction around the sites, ignition of the unit away from the site boundaries, escaped fires and the specifics of archaeological and historic sites. Blocks of the prescribed burn areas may be excluded from burning altogether to adequately protect sites.

Cambium-barked trees will be raked around prior to underburning to reduce fuel accumulations in an effort to avoid lethal basal scorch or torching of the crowns. No fuels treatments will be permitted within the site boundaries of cultural sites. Hand and dozer lines will be directed around sites to avoid disturbance of potential buried cultural deposits. A cultural resource technician will monitor all fuel treatment activities, especially along dozer lines, mechanical operations, and in close proximity to known sites. All sites along or adjacent to treatment areas will be flagged on the ground for identification and protection. Flagging will be refreshed during project layout. Mechanized activities will not take place at night so site boundaries can be readily located.

All archaeological, cultural and historic sites, along or adjacent to, treatment areas will be flagged on the ground for identification and protection. The flagging will be renewed during project layout, and sites will be protected in place from project activities. The Archaeologist or Cultural Resource Technician Monitor will work closely with both the Timber Sale and Service Contracting Officers and their representatives to ensure site protection measures are clearly identified on the ground and monitor the ground disturbing activities. Given the protection measures described above, the Ninemile Fuel Reduction Project will have no significant effect on cultural resources.

Traditional Use Plants

There are various ethnobotanical plant species indigenous to the project area of cultural significance to the Klamath Tribes. These include pine species, aspen (*Populus tremuloides*), willow (*Salix sp.*), plum (*Prunus sp.*), currant (*Ribes sp.*), serviceberry (*Amelanchier alnifolia*), kinnickinick or bearberry (*Arctostaphylos uva-ursi*), yarrow (*Achillea millifolium*), Rocky Mountain iris (*Iris missouriensis*), wild strawberry (*Fragaria virginiana*), and various sedges, rushes and grasses. These plants are fairly typical of the historical occurrence of plant species of cultural importance within the project site. Some plants may occur in lesser numbers than historically because of the dominance of many areas of Ninemile by dense conifer stands, and the lack of fire disturbance.

Effects

Alternative 1 No Action

Alternative 1 would forgo the opportunity to restore any habitats that have departed from historic conditions. Plants that are in decline from lack of disturbance or from conifer site dominance would not be released or stimulated, nor would existing plants be killed or damaged by planned activities.

Alternative 2 Proposed Action

Alternative 2 will remove woody canopy cover and biomass and reintroduce fire in parts of the planning area. These actions would result in vegetation more similar to what occurred prior to European settlement. Reduced canopy cover, mechanical disturbance, and burning will likely result in sprouting and new growth of shrubs and increased germination of many species. Underburning would stimulate growth of many species, particularly willow, strawberry and plum. Previous experience with burning in apos sites has shown an increase in the numbers of plants following burning. While many species are tolerant of ground-disturbing activities or respond positively to it, others, such as prince's pine, do not.

Wildlife Species of Interest to the Klamath Tribes

The Klamath Tribes have expressed interest in a wide variety of animal species. The change in forest structural conditions over time in Ninemile from historic open, park-like stands to dense, conifer dominated stands has favored some species and resulted in declines in numbers of other species. The proposed treatments of conifer thinning, brush mowing and underburning will move stands back toward the historic open conditions.

Because the area to be treated in the action alternative is small compared to the surrounding forest, effects of the treatments will be local, affecting individuals but not populations of the listed species. Disturbance of an individual during implementation of the project and through habitat change is a short-term effect. Predators may be indirectly, negatively affected in the short term by the disturbance to their prey and reduction of denning structure in the local area, but positively affected over the long term by an increase prey numbers related to the improvement in forage quality. In

general, wildlife species that favor older forested stands will benefit in the long term from the treatments, but species that prefer brushy or young, dense, seral stages will not be favored.

Table 3-15 shows the list of wildlife species that the Tribes consider important as part of their heritage and as treaty resources, and the effects on these species from both the No Action (Alternative 1) and the Proposed Action (Alternative 2) of the Ninemile Project. Effects on wildlife species are discussed in more detail in the Wildlife section of Chapter 3.

Table 3-15. Klamath Tribe Wildlife Species of Interest and Effects

Tribal Species of Interest	Species or Habitat Present (Yes/No)	Alternative 1 Effects Determination	Alternative 2 Effects Determination
American marten	Yes	MIIH	MIIH
American peregrine falcon	No	NE	NE
American white pelican	No	NE	NE
Bald eagle	Yes	NLAA	NLAA
Bank swallow	No	NE	NE
Belted kingfisher	Yes	NE	MIIH
Black bear	Yes	MIIH	MIIH
Black tern	No	NE	NE
Black-backed woodpecker	Yes	MIIH	MIIH
Black-crowned night heron	Yes	NE	MIIH
Blue grouse	Yes	MIIH	MIIH
Bobcat	Yes	MIIH	MIIH
California wolverine	No	NE	NE
Canada lynx	No	NE	NE
Coyote	Yes	MIIH	MIIH
Elk	Yes	MIIH	MIIH
Ferruginous hawk	No	NE	NE
Great blue heron	Yes	MIIH	MIIH
Great gray owl	Yes	MIIH	MIIH
Greater sage grouse	No	NE	NE
Green heron	No	NE	NE
Horned lark	Yes	MIIH	MIIH
Loggerhead shrike	Yes	MIIH	MIIH
Long-billed curlew	No	NE	NE
Mink	Yes	NE	MIIH
Mountain bluebird	Yes	MIIH	MIIH
Mountain lion	Yes	MIIH	MIIH
Mountain quail	Yes	MIIH	MIIH
Mourning dove	Yes	MIIH	MIIH
Mule deer	Yes	MIIH	MIIH
Northern goshawk	Yes	MIIH	MIIH
Northern spotted owl	Yes	NLAA	NE
Pacific fisher	No	NE	NE
Pacific pallid bat	Yes	MIIH	MIIH
Pileated woodpecker	Yes	MIIH	MIIH
Pronghorn antelope	Yes	MIIH	MIIH
Pygmy nuthatch	Yes	MIIH	MIIH
Pygmy rabbit	No	NE	NE
River otter	No	NE	NE
Ruffed grouse	Yes	MIIH	MIIH
Sandhill crane	Yes	MIIH	MIIH
Snowshoe hare	No	NE	NE
Three-toed woodpecker	Yes	MIIH	MIIH
Townsend's big-eared bat	No	NE	NE
Tricolored blackbird	No	NE	NE
Western gray squirrel	Yes	MIIH	MIIH
Western tanager	Yes	MIIH	MIIH
White-headed woodpecker	Yes	MIIH	MIIH
Wood duck	Yes	NE	MIIH
Yellow rail	Yes	MIIH	MIIH

Effects Determination Code for Tribal Species of Interest
 NE = No Effect from the project on the species or its habitat.
 NLAA = The project may affect the species or its habitat, but those effects are not likely to adversely affect the species or habitat.
 MIIH = The project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

3.2 Affected Environment and Effects Relating to Other Issues

Wildlife

There are additional discussions of the effects on big game habitat and wildlife species of interest to the Klamath Tribes under Key Issue #2, above.

Management Indicator Species (MIS) and their respective habitats serve to show population and habitat trends for other species that use similar forest resources. Northern spotted owls, pileated woodpeckers, northern goshawks and martens are identified in the Winema LRMP as Old Growth Ecosystems Management Indicator Species. All are addressed in other sections of this report, below. MIS species are designated as (M) in Table 3-18.

Effects

Alternative 1 No Action

Conifers will continue to dominate the landscape and encroach on forest openings, meadows, aspen stands and sagebrush flats within the Ninemile Project. Canopy closure will continue to increase in forested stands. The high fuel loadings associated with decadent brush and densely forested stands will increase over time. The risk of a stand-replacing wildfire destroying all habitats for species that are associated with mid- to late-successional forested stands would remain unabated if no treatments occur.

Specific effects on the various species of concern found within the project area are discussed below. On the species level, these changes will not likely affect population viability or create a trend toward Federal listing as threatened or endangered, or cause jeopardy to species already listed.

Within the ponderosa pine stands bald eagles, osprey, flammulated owls, pygmy nuthatches and other species such as bats, white-headed woodpeckers and Williamson's sapsuckers which are associated with larger trees and open, late-seral forests would have smaller quantities of high-quality habitat under the No Action Alternative than if treatments do occur in the project area. This would be due to continued overstocking of trees within the ponderosa pine stands, which causes suppression of tree growth and slower attainment of old-growth characteristics including large trees interspersed with openings, snags and logs. Ponderosa pine continues to produce cones and seeds even at high stocking levels, and canopy closure and aerial travel routes will remain unchanged for gray squirrels. Squirrels often den in cavities in larger trees and snags, which would be limited under the No Action Alternative.

The overstocked stands retained under the No Action Alternative could be a benefit to black-backed woodpeckers, which prefer to nest and forage on small diameter snags. These birds are associated with fires and beetle outbreaks that frequently occur in conditions similar to that currently found in the project area.

In the pine associated stands, species such as brown creepers, goshawks, great gray owls, olive-sided flycatchers, pileated and three-toed woodpeckers, spotted owls and

martens which are associated with dense, multi-layered, or late-seral mixed-conifer stands will experience an increase in habitat over time if no treatments occur within the project area, due to white fir encroachment around the edges of Chiloquin Ridge and Ya Whee Plateau.

Alternative 2 Proposed Action

Fuel reduction units with harvest as part of the prescribed treatments include commercial thinning from below, removing trees between 4 and 21 inches DBH and the removal of encroaching juniper. Postharvest fuels reduction treatments include, as appropriate, whip falling of excess 0 to 4 inch DBH stems, machine piling of whipfall debris, burning of machine piles, mowing and slashbusting of existing brush, and a mosaic underburn of accumulated natural fuels. Where appropriate, approximately 10% of each harvest unit will be left untreated to meet wildlife and visual concerns.

Harvest effects differ by the timber type being entered. Of the 3461 acres proposed for commercial harvest in the Ninemile Project, 282 acres are in the mixed conifer forest type or pine associated plant associations.

Harvest in pine associated units H50 and H51 will alter habitat for black bear, blue grouse, bobcat, coyote, elk, great gray owl, hermit thrush, mountain lion, mule deer, northern goshawk, olive-sided flycatcher, Pacific fringe-tailed bats, western gray squirrel, western tanager and Williamson's sapsucker. Effects on spotted owls are discussed separately. In the short term, harvest and fuel reduction activities will produce patches of early successional habitats preferred by many of the species, but have long term positive effects on forest health, and will accelerate development of old growth forest characteristics that will benefit the other species in the long-term. No known nest or denning sites occur within the harvest units, but individuals of these species, if present in the area, could experience short-term negative effects from disturbance during implementation of the project prescriptions. The disturbance will not likely affect population viability or create a trend toward Federal listing as threatened or endangered. If a nest or den site is discovered, the appropriate project design features will be applied to protect the site.

American marten, brown creeper, flammulated owl, Pacific fringed-tailed bat, pileated woodpecker, three-toed woodpecker, and Williamson's sapsucker depend on snags and/or down logs for nesting, denning or foraging. Although there will be no reduction in the habitat available for these species during harvest, there will be an increase in disturbance to individuals in the area and the disturbance may cause individuals to move to other areas. Operational disturbance will not likely affect population viability or create a trend toward Federal listing as threatened or endangered. All snags and large woody debris will be retained and protected, whatever their condition class, from felling and fire operations where operationally feasible unless there is an over-riding safety concern for a particular snag (see Appendix B).

Approximately 3179 acres of commercial harvest is proposed in the Ninemile Project within the ponderosa pine forest types. Species associated with old growth ponderosa pine forest communities include flammulated owl, mountain bluebird, pallid bat, pygmy nuthatch, western gray squirrel, and white-headed woodpecker. The majority of these species are associated in some way with ponderosa pine snags, either for foraging or

roosting and denning sites. No known nest or denning sites for these species occur within the harvest units. The increase in disturbance from logging operations may cause individuals to move to other areas to forage, but will not likely affect population viability or create a trend toward Federal listing as threatened or endangered. If a nest or den site is discovered, the appropriate project design features (Appendix B) will be applied to protect those sites.

Units H1 and H57, near the Sprague River, provide foraging, denning and nesting habitat for bald eagles, belted kingfisher, black-crowned night heron, mink, mourning dove, osprey, olive-sided flycatchers, Pacific fringe-tailed and Pacific pallid bats, and wood ducks. Riparian Reserve buffers will ensure that riparian-dependent species will continue to have undisturbed habitat, including perches and roost trees adjacent to the river. All snags and large woody debris within the units will be retained and protected, whatever their condition class, from felling and fire operations where operationally feasible unless there is an over-riding safety concern for a particular snag. Protecting snags will ensure that bald eagles and ospreys foraging and nesting along the river will have adequate habitat. Seasonal restrictions on operations will limit disturbance (see Appendix B).

In natural fuels units, there is no commercial harvest of trees proposed as part of the overall fuel reduction treatment. Units include, as appropriate, whip falling and/or pre-commercial thinning of excess 0 to 8" dbh conifer stems, hand piling of whipfall concentrations and burning of hand piles, jackpot burning of unpiled whipfall concentration, machine mowing or slashbusting of existing brush in combination with mosaic underburning of accumulated fuels. Underburning and slashbusting will retain approximately 30% of the existing bitterbrush in treated units, which will maintain seed sources and brush age diversity within the units. Up to 100% of units occupied by manzanita/ceanothus brush will be treated. These species are stimulated to produce new seedlings by fire or mechanical disturbance, and the plants are expected to rebound quickly and provide quality forage in the short term (≤ 10 years), and in the long term (> 10 years) return to a state similar in size to their current status.

In the short term, bobcats and mountain lions will not benefit from treatments removing the dense shrub cover that they utilize for hunting from concealment, although an eventual increase in prey species foraging on more vigorous and palatable plants may balance the negative effect. Shrub dependant and associated species such as black bear, coyote, elk, mountain quail, mourning doves, and mule deer will experience long-term benefits from the proposed treatments, as these species prefer early-successional brush habitats for at least part of their life functions, rather than the current habitat of decadent brush.

There is a 63 acre Management Area 7 - Old Growth Ecosystem designated for goshawk habitat within the project area near Corbell Butte, and one known goshawk nest site on the southeastern edge of the Ninemile Project. There are no treatments planned within the MA-7, and it is currently unoccupied by goshawks. Seasonal restrictions will be applied near the known nest site as noted in Appendix B. Primary hunting and fledging activities for this goshawk nest site occur within the mixed conifer forest along the west side of Ya Whee Plateau, outside the project boundary. A Post Fledging Area (PFA), as required under the Eastside Screens, will be established in the appropriate location there. Monitoring of the known nest site and other locations will

continue through implementation of the project.

Creating more open forest stands are beneficial to goshawk foraging habitat. Retention and development of late-successional forest habitats that are utilized by goshawks for nest stands will be also be enhanced through removal of competing vegetation. Snags and coarse woody debris that are important components of goshawk habitat will be protected in the proposed units, unless they pose a safety hazard. There may be an impact through disturbance during implementation on individuals utilizing the forests outside the nest area buffer, but in the long term, treatments will benefit goshawk habitat, and will not lead to a trend toward federal listing or cause a loss of viability to the population or species.

Surveys have detected one great gray owl nest site outside the project boundary near Rocky Hole Reservoir, and one nest and pair site adjacent to Wright's Meadow. Surveyors will continue to attempt to locate the specific nest stands for the latter site, and monitor the known nest sites. Seasonal restrictions have been applied to all of the sites, as noted in Appendix B.

The Winema LRMP (p. 4-112) encourages stopping or reversing forest tree encroachment on meadows, which are a main component of great gray owl foraging habitat. Treatments such as underburning, thinning, juniper removal and whipfelling around the edges of meadows, and creating more open forest stands are beneficial to great grey owl foraging habitat. Retention and development of late-successional forest habitats that are utilized by great gray owls for nest stands will be also be enhanced through removal of competing vegetation. Snags that are used as nest platforms will be protected from removal in the proposed units, unless they pose a safety hazard. There may be an impact through disturbance during implementation on individuals utilizing forest stands outside of the required nest buffers, but in the long term, treatments will benefit great gray owl habitat, and will not lead to a trend toward federal listing or cause a loss of viability to the population or species.

There was one osprey nest site along Sprague River Road, which was taken over by bald eagles in April 2004. Monitoring will continue, to determine if a new osprey nest site has been established elsewhere within the project area.

Retention of large, live trees with broken tops that are utilized by osprey for nest trees will be emphasized in the project's silvicultural prescriptions, and development of larger trees will be enhanced through removal of competing vegetation. Snags that are also used as nest trees will be protected from removal in the proposed units, unless they pose a safety hazard. There may be an impact on individuals utilizing portions of the project area through disturbance during implementation, but in the long term treatments will benefit osprey habitat, and will not lead to a trend toward federal listing or cause a loss of viability to the population or species.

There is a Cooper's hawk nest located in the northeastern portion of the Ninemile Project. There is also a historic nest located near Dockney Flat. Monitoring will continue, to determine current locations and activity status of the nests. As required in the Winema LRMP, the nest tree and surrounding stands utilized by the Cooper's hawks will be protected from thinning activities, and a seasonal restriction will be applied within ¼ mile of the nest. There may be an impact on individuals utilizing

portions of the project area outside of the buffer zone through disturbance during implementation.

Cooper's hawks prefer to nest in more widely spaced, older stands, as described in *Birds of Oregon* (Marshall et al. 2003). In the long term the proposed Ninemile Project treatments will benefit Cooper's hawk habitat, and will not lead to a trend toward federal listing or cause a loss of viability to the population or species.

There is an active red-tailed hawk nest on Chiloquin Ridge outside the southwestern boundary of the project. It is not within ¼ mile of any proposed units, therefore no seasonal restrictions need be applied. There will be an immediate and long-term beneficial effect from implementation of the Ninemile Project on red-tailed hawks, due to the reduction in encroaching conifers on the open lands that red-tailed hawks use for foraging. This is consistent with the habitat needs for red-tailed hawks described in Marshall et al. (2003).

Snags and Down Wood

Proposed activities will not remove snags or coarse woody debris. Snags, large coarse wood, and old growth juniper trees with dead wood will be protected from removal or damage in proposed units, unless safety is compromised. Snags will be tallied in harvest units when layout and marking takes place, and the data may be used as a basis to snag creation in future projects if needed. Down wood and snags of all decay classes will be protected where operationally feasible during burning treatments in all of the units. This will maintain the existing habitat for species associated with snags and down wood, including bats, flammulated owls, brown creepers, martens, black bears, and woodpeckers. Biologists will work cooperatively with the timber sale planner, sale administrator, and fuels specialist to assure the protection of selected trees, snags, and large coarse wood while taking into consideration the safety requirements and logistics of the logging and burning operations. Winema LRMP guidelines, as amended by Eastside Screens, will be met by retaining existing snag and down wood. Additional snags and down wood could be created in future projects.

Cumulative Effects

Treatments similar to those proposed in the Ninemile Project have already been implemented on Forest Service lands to the west of this project, in the Chiloquin Community Fuels Reduction Project. In the future, the Forest Service intends to continue the fuels reduction treatments on lands north of the private properties along Sprague River Road, in the Ninemile North Project. In addition, several fires on the Chiloquin District, including the Lone Pine and Quick Fires, have impacted wildlife species through returning the majority of the burned areas to early seral conditions. Over this larger area, the effects of ongoing and proposed treatments on bird and other wildlife species will be similar to those described above.

Threatened, Endangered, and Candidate Species Terrestrial Wildlife

The list of federally Endangered, Threatened and Candidate species (dated 04/21/2004) was reviewed for species that may be present on the Fremont-Winema National Forests, and found within or immediately adjacent to the project area. No habitat currently exists or will exist in or adjacent to the project area for Canada lynx, Mardon skipper butterflies, Oregon spotted frogs, Pacific fishers or yellow-billed cuckoos. There will be no Effect or Impact from the Proposed Action to any of these species.

Effects

Alternative 1 No Action

The No Action Alternative allows conifers to continue encroaching on forest openings, meadows, aspen stands and sagebrush flats within the Ninemile Project. Canopy closure will continue to increase in forested stands. The high fuel loadings associated with decadent brush and densely forested stands will increase over time. The risk of a stand-replacing wildfire destroying all habitats for species such as bald eagles and spotted owls that are associated with mid- to late-successional forested stands would remain unabated if no treatments occur. This risk is speculative, but based on local fire history such an event is reasonably foreseeable to occur within the next 30 years. However, the effects of such a fire are outside the scope of the project analysis.

Bald eagles and other species which are associated with larger trees and open, late-seral forests would have smaller quantities of high-quality habitat under the No Action Alternative than if treatments do occur in the project area. This would be due to continued overstocking of trees within the ponderosa pine stands, which causes suppression of tree growth and slower attainment of old-growth characteristics including large trees interspersed with openings, snags and logs. While this will have a slight effect on the local level, it May Affect, but will Not Likely Adversely Affect (NLAA) bald eagles as a species.

Species such as spotted owls which are associated with dense, multi-layered, or late-seral mixed-conifer stands will experience an increase in habitat over time if no treatments occur within the project area, due to white fir encroachment around the edges of Chiloquin Ridge and Ya Whee Plateau. This is beneficial, and May Affect, but will Not Likely Adversely Affect (NLAA) spotted owls on the local and species level.

Alternative 2 Proposed Action

Bald Eagle

One established bald eagle nest is located on private land near the Sprague River, approximately 1 mile from the nearest proposed unit, which is outside any buffer area requiring seasonal restrictions. There will be No Effect from the Proposed Action on this bald eagle nest.

A new bald eagle nest was discovered in April 2004 along the Sprague River Road, in a proposed harvest unit. It does not currently have an assigned nest number. Seasonal restrictions to prevent disturbance of the eagles at the site will be applied, as noted in

the Project Design Features section. Management of fuels by thinning, slashbusting and prescribed fire around the nest tree is beneficial in the long term, in that it prevents loss of the nest tree and any possible replacement trees due to uncharacteristically severe wildfire. By retaining the best quality trees and reducing competition, the Ninemile project's proposed action will also improve growth in replacement nest and perch trees. The proposed treatments May Affect but will Not Likely Adversely Affect the bald eagles at the new nest site. It will have a beneficial effect on habitat affecting these individual eagles, but there will be no effect on the species as a whole.

Riparian Reserve buffers on units H1 and H57 ensure that they will continue to have undisturbed habitat, including perches and roost trees adjacent to the river. All snags and large woody debris within the units will be retained and protected, whatever their condition class, from felling and fire operations wherever operationally feasible unless there is an over-riding safety concern for a particular snag. Protecting snags will ensure that bald eagles foraging and nesting along the river will have adequate habitat, and seasonal restrictions on operations near the bald eagle nest will limit disturbance (see Appendix B).

Northern Spotted Owl

There have been historic detections of spotted owls at many locations along the ridge west of the project. There is one designated site adjacent to the project area on Chiloquin Ridge that last nested in 2002. It is approximately 0.3 miles from the nearest treatment unit. This unit is not close enough to the nest site to cause disturbance during thinning or fuels reduction operations, and is outside the buffer zone listed in Appendix B. There is no Nesting, Roosting and Foraging, or Dispersal habitat inside the project boundary within 1.2 miles of the nest site. There is no designated Critical Habitat for spotted owls within the project. The Proposed Action will have No Effect on northern spotted owls on either the local or species level.

Harvest in pine associated units H50 and H51 will not alter habitat for northern spotted owls. The harvest will in the short term produce patches of early successional habitats, but have long term positive effects on forest health, and accelerate development of old growth forest characteristics that will benefit the species in the long-term. No known nest sites occur within the harvest units. If any are discovered, the appropriate seasonal restrictions will be applied.

Table 3-16 displays the summary of effects on threatened and endangered species. The complete Biological Assessment may be found in the Project Record. Forest Service personnel met or conversed with staff of the U. S. Fish and Wildlife Service to discuss potential ramifications of the Ninemile Fuels Reduction Project on May 29 and October 9, 2003, and April 21, 2004. The USFWS concurred with the effects displayed below in a letter dated June 16, 2004.

Table 3-16. Summary of Determination of Effects for Threatened and Endangered and Candidate Terrestrial Wildlife Species for Ninemile

Federally Threatened (T), Endangered (E), and Candidate (C) Species (List dated April 21, 2004)	Alternative 1 No Action	Alternative 2 Proposed Action
Bald eagle (<i>Haliaeetus leucocephalus</i>) (T)	NLAA	NLAA
Canada lynx (<i>Lynx canadensis</i>) (T)	NE	NE
Mardon skipper butterfly (<i>Polites mardon</i>) (C)	NI	NI
Northern spotted owl (<i>Strix occidentalis</i>) (T)	NE	NLAA
Oregon spotted frog (<i>Rana pretiosa</i>) (C)	NI	NI
Pacific fisher (<i>Martes pennanti</i>) (C)	NI	NI
Yellow-billed cuckoo (<i>Coccyzus americanus</i>) (C)	NI	NI
Effects Determination Code for Threatened or Endangered Species NE = No Effect from the project on the species or critical habitat. LAA = The project may affect and is likely to adversely affect the species or critical habitat. Formal Consultation with U.S. Fish & Wildlife Service is required. NLAA = The project may affect the species or critical habitat, but those effects are not likely to adversely affect the species or critical habitat. Informal Consultation is required with concurrence from the U.S. Fish & Wildlife Service. Effects Determination Code for Candidate Species NI = No Impact from the project on the species or its habitat MIH = The project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.		

There will be no direct effects from this project on any species of concern. No individuals will be directly harmed or benefited by implementation of the Proposed Action, or through the No Action Alternative. All effects from the Proposed Action are indirect, through habitat manipulation, or disturbance of individual animals. The No Action Alternative would also have an indirect effect on habitat.

Sensitive Species

The Forest Service Region 6 Sensitive Animal list (revised November 2000) was reviewed for species which may be present on the Fremont-Winema National Forests. Of the R6 Sensitive species listed, no habitat currently exists or will exist in or adjacent to the project area for the American peregrine falcon, California wolverine, harlequin duck, horned grebe, least bittern, northwestern pond turtle, Oregon spotted frog, Pacific fisher, red-necked grebe, tricolored blackbird, or yellow-billed cuckoo. There will be no impact from the Proposed Action to these species.

Landbird Species of Concern

The Forest Service has an agreement with Partners in Flight to develop a strategy for achieving functioning ecosystems for landbirds. The local species are described in the Partners in Flight East-Slope Cascade Mountains Bird Conservation Plan (2000). In this document, focal species are identified that are highly associated with important attributes or conditions within each habitat type.

Table 3-17. Biological Evaluation for Sensitive Terrestrial Animal Species: Summary of Conclusion of Effects.

R-6 Sensitive Species with Individuals or Habitat Present in Ninemile	Alternative 1 No Action	Alternative 2 Proposed Action
Gray flycatcher (<i>Empidonax wrightii</i>)	NI	MIIH
Pacific fringe-tailed bat (<i>Myotis thysanodes vespertinus</i>)	NI	MIIH
Pacific pallid bat (<i>Antrozous pallidus pacificus</i>)	NI	MIIH
Yellow rail (<i>Coturnicops noveboracensis</i>)	NI	NI
NH = No habitat present in Ninemile NI = No Impact MIIH = May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.		

The 1988 amendment to the Fish and Wildlife Conservation Act mandated the USFWS to “identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973.” The USFWS developed the document Birds of Conservation Concern 2002 (USDI 2002) as the most recent effort to carry out this requirement. The USFWS recommends that the lists contained in BCC 2002 be consulted in accordance with Executive Order 13186, “Responsibilities of Federal Agencies to Protect Migratory Birds.” BCC 2002 is primarily derived from assessment scores from three major bird conservation plans: Partners in Flight, the United States Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. Part of the process was delineating Bird Conservation Regions (BCRs). The BCR relevant for the Ninemile area is BCR 9 (Great Basin).

Current Condition

In general, dry forests east of the Cascades were under a fire regime that controlled extensive understory development. Currently eastside stands, including those in the Ninemile Project Area, have dense understories. These dense understories tend to favor red-breasted nuthatches, Cassin’s vireos, American robins, and spotted towhees. Most of the bird species of concern would benefit from underburning in the long-term. Uncertainties include the optimal size and intensity of such burns for avian benefits.

The amount of old growth ponderosa pine forest that has been maintained by frequent, low-severity fires has declined by approximately 85% from historical conditions to the present across the Pacific Northwest, the Klamath Plateau and the eastern slopes of the Cascades. Species associated with this community, such as the white-headed woodpecker and flammulated owl, and those linked strongly with fire affected forests such as Lewis’s woodpecker, northern three-toed and black-backed woodpeckers, mountain and western bluebirds have likely declined in abundance. (Johnson and O’Neil 2001).

Effects

Alternative 1 No Action

Most of the bird species listed above are declining due to loss or degradation of old growth ecosystems. Unnaturally dense understories threaten the remaining old growth structure with high fuel loading and potential loss of large trees and snags used by most of these species from stand replacement wildfires. Continuation of no action could have a detrimental effect on the following focal landbird and management indicator species due to the threat of conflagration or deterioration of old growth characteristics over time: northern goshawk, white-headed woodpecker, pygmy nuthatch, Williamson's sapsucker, Lewis's woodpecker, brown creeper, flammulated owl, olive-sided flycatcher and Clark's nutcracker.

The landbird species of concern that are located in or have habitat in the Ninemile Area are listed in Table 3-18. This table summarizes the effects for the species discussed above and in the section on species of concern to the Klamath Tribes. Landbirds are coded as (L) in the table.

Alternative 2 Proposed Action

This alternative would potentially have a positive effect on those bird species that are associated with old growth pine stands with a large snag component. These include white-headed woodpecker, pygmy nuthatch, brown creeper, Williamson's sapsucker, and northern goshawk. Species that would benefit specifically from the proposed underburning include Lewis's woodpecker and olive-sided flycatchers. Species that require thickets of understory such as flammulated owl and hermit thrush would be expected to experience a negative effect.

Some local bird species, especially those that nest on the ground or in brush or lower branches may be impacted from removal of brush and dense thickets. Representative species from that group include dark eyed juncos, chipping sparrow, hermit thrush, dusky and Hammond's flycatchers, nighthawks and some species of hummingbirds. There are other bird species for which less is known about the species response to underburns. Human disturbance associated with timber cutting, brush mowing, wood cutting or prescribed burning may lead to nest abandonment, especially of ground nesting birds.

The timing, size and completeness of burns would have varying effects on the local bird populations. Underburns in areas with bitterbrush will leave between 10 and 25 percent of the total burn area in untreated patches. Local birds would probably be able to find refugia for nesting and foraging. Timing of burning could also impact by burning the nest or nestlings of locally breeding birds. Fall burns would mitigate these potential direct effects. Activities are expected to occur over a possible ten year period, which will lessen the effects on local bird populations in any given year.

Indirect effects would include a shift of returning migrants from their breeding grounds during spring treatments in Ninemile. Indirect effects also include loss of structure and vegetation that support prey. After burning, forest insects may increase in the area temporarily. Insectivorous birds, such as Lewis's and other woodpeckers, flycatchers, and nuthatches may also increase, at least temporarily, in response.

Table 3-18. Summary of Effects on Ninemile Terrestrial Wildlife Species of Concern

Species and Category of Interest T = Threatened R = Region 6 Forest Service M = Management Indicator Species W = Winema National Forest K = Klamath Tribes L = Landbirds	Alternative 1 No Action	Alternative 2 Proposed Action
American marten (<i>Martes americana</i>) (W, K M)	MIIH	MIIH
Bald eagle (<i>Haliaeetus leucocephalus</i>) (T, W, K)	NLAA	NLAA
Belted kingfisher (<i>Cyryle alcyon</i>) (K)	NE	MIIH
Black bear (<i>Ursus americanus</i>) (K)	MIIH	MIIH
Black-backed woodpecker (<i>Picoides arcticus</i>) (K, L)	MIIH	MIIH
Black-crowned night heron (<i>Nycticorax nycticorax</i>) (K)	NE	MIIH
Blue grouse (<i>Dendragapus obscurus</i>) (K)	MIIH	MIIH
Bobcat (<i>Lynx rufus</i>) (K)	MIIH	MIIH
Brown creeper (<i>Certhia Americana</i>) (L)	MIIH	MIIH
Coyote (<i>Canis latrans</i>) (K)	MIIH	MIIH
Elk (<i>Cervus elaphus</i>) (W, K)	MIIH	MIIH
Flammulated owl (<i>Otus flammeolus</i>) (W, L)	MIIH	MIIH
Golden eagle (<i>Aquila chrysaetos</i>) (W, L)	MIIH	MIIH
Gray flycatcher (<i>Empidonax wrightii</i>) (R)	MIIH	MIIH
Great blue heron (<i>Ardea herodias</i>) (W, K)	MIIH	MIIH
Great gray owl (<i>Strix nebulosa</i>) (W, K)	MIIH	MIIH
Hermit thrush (<i>Catharus guttatus</i>) (L)	MIIH	MIIH
Horned lark (<i>Eremophila alpestris</i>) (K)	MIIH	MIIH
Loggerhead shrike (<i>Lanius ludovicianus</i>) (K, L)	MIIH	MIIH
Mink (<i>Mustela vison</i>) (K)	NE	MIIH
Mountain bluebird (<i>Sialia currucoides</i>) (K)	MIIH	MIIH
Mountain lion (<i>Puma concolor</i>) (K)	MIIH	MIIH
Mountain quail (<i>Oreortyx pictus</i>) (K)	MIIH	MIIH
Mourning dove (<i>Zenaida macroura</i>) (K)	MIIH	MIIH
Mule deer (<i>Odocoileus hemionus hemionus</i>) (W, K)	MIIH	MIIH
Northern goshawk (<i>Accipiter gentilis</i>) (W, K, M)	MIIH	MIIH
Northern spotted owl (<i>Strix occidentalis</i>) (T, W, K, M)	NLAA	NE
Olive-sided flycatcher (<i>Contopus cooperi</i>) (L)	MIIH	MIIH
Osprey (<i>Pandion haliaetus</i>) (W)	MIIH	MIIH
Pacific fringe-tailed bat (<i>Myotis thysanodes vespertinus</i>) (R)	MIIH	MIIH
Pacific pallid bat (<i>Antrozous pallidus pacificus</i>) (R, K)	MIIH	MIIH

Pileated woodpecker (<i>Dryocopus pileatus</i>) (W, K, M)	MIIH	MIIH
Pronghorn antelope (<i>Antilocapra americana</i>) (K)	MIIH	MIIH
Pygmy nuthatch (<i>Sitta pygmaea</i>) (K)	MIIH	MIIH
Red-naped sapsucker (<i>Sphyrapicus nuchalis</i>) (L)	MIIH	MIIH
Ruffed grouse (<i>Bonasa umbellus</i>) (K)	MIIH	MIIH
Sandhill crane (<i>Grus canadensis</i>) (K, L)	MIIH	MIIH
Swainson's hawk (<i>Buteo swainsoni</i>) (L)	MIIH	MIIH
Three-toed woodpecker (<i>Picoides tridactylus</i>) (K)	MIIH	MIIH
Western gray squirrel (<i>Sciurus griseus</i>) (K)	MIIH	MIIH
Western tanager (<i>Piranga olivacea</i>) (K)	MIIH	MIIH
White-headed woodpecker (<i>Picoides albolarvatus</i>) (K, L)	MIIH	MIIH
Williamson's sapsucker (<i>Sphyrapicus thyroideus</i>) (L)	MIIH	MIIH
Wood duck (<i>Aix sponsa</i>) (K)	NE	MIIH
Yellow rail (<i>Coturnicops noveboracensis</i>) (R, K, L)	MIIH	MIIH
<p>Effects Determination Code for Threatened Species NE = No Effect from the project on the species or critical habitat. NLAA = The project may affect the species or critical habitat, but those effects are not likely to adversely affect the species or critical habitat. Informal Consultation is required with concurrence from the U.S. Fish & Wildlife Service.</p> <p>Effects Determination Code for non-T and E Species of Concern NI = No Impact from the project on the species or its habitat MIIH = The project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.</p>		

Botany

Past History and Current Condition

Habitat in the project area is diverse. Forested stands are primarily ponderosa pine/bitterbrush/Idaho fescue or ponderosa pine/bitterbrush/needlegrass. Mixed conifer (white fir/snowbrush-squawcarpet/strawberry occurs on some of the upper slopes. Lodgepole pine and aspen stands occur along some of the drainages and at the edges of meadows. The project area contains a large amount of non-forested habitat, including vernal moist scab rock flats with sagebrush, grass or sedge dominated dry, moist, and wet meadows, and rocky ridges with juniper and mountain mahogany. The area lies near the southern edge of the central Oregon pumice zone and is mostly characterized by residual or shallow pumice soils.

The primary influences on vegetation in the project area include removal of large diameter pine, succession in the absence of fire, and livestock grazing. Past activities on the District have been recorded since 1961, the year the Winema National Forest was established. Since 1961, approximately 16% of the NFS land in the project area has been logged. Prior to the 1960's high grading of large ponderosa pine probably occurred over much of the area. Currently old growth stands occur over less than 10% of NFS lands in the planning area. Numerous fire starts have occurred, however, only

3.5% of the project area has burned during the past four decades. The only major fire event was the 1992 Lone Pine Fire, which overlapped the northeast part of the project area. Permitted livestock grazing ceased in the project area during the mid 1990's. Prior to that time, livestock grazing had probably occurred in the area for over 100 years. Both grazing and fire suppression have likely been important in reducing fire frequency in the project area. Fire history studies such as those in Agee (1993) and Miller et al. (2001) have shown significant declines in mean fire return intervals in the Great Basin and in Pacific Northwest forest. These declines began with European settlement and grazing in the late 1800's, prior to the advent of effective fire suppression. Ninemile exhibits the same trends described in these sources, as documented in the South of Sprague Watershed Analysis (1995).

The combination of past activities and events has resulted in an increase in forest stand density, decline of aspen stands, increase in shrub density, encroachment of juniper and lodgepole pine into meadows, and increase of juniper on ridges, compared to pre-settlement times. Additionally, many of the shrubs in the project area are in a dense, decadent condition with accumulation of woody material and reduction of new growth. Germination of many woody and herbaceous species is limited by duff and litter accumulation, as well as shrub and tree canopy cover.

The project area has habitat for a majority of Native American traditional use plants described in *A Field Guide to Ethnobotanical Plants of the Winema National Forest* (Emanuel 1994). In particular, the large meadow complexes and scablands provide good habitat for species of biscuitroot (*Lomatium spp.*), camas (*Camassia quamash*), apos (*Perideridia spp.*), wild buckwheat (*Eriogonum spp.*), yarrow (*Achillea millefolium*), brodiaea (*Brodiaea spp.*, *Triteleia spp.*), wild iris (*Iris missouriensis*), and wild onions (*Allium spp.*). Shrub species such as cherry (*Prunus spp.*), mountain mahogany (*Cercocarpus ledifolius*), currant (*Ribes spp.*), and serviceberry (*Amelanchier alnifolia*) are common on ridges and in forest openings. One future restoration unit, which will be covered in a separate document, was specifically proposed to stimulate apos growth with burning.

The Winema National Forest does not contain suitable habitat for any Federally Listed, Proposed, or Candidate plant species. Table 3-19 lists species currently on the Region 6 Sensitive Plant Species List known or suspected to occur on the Winema. A number of sensitive plants species have potential habitat in the project area. To date, the only species currently on the sensitive species list found in the project area is Peck's milkvetch, *Astragalus peckii*.

A large population (est. 100000 plants) of Peck's milkvetch occurs in one of the meadow systems tributary to Copperfield Draw. Peck's milkvetch is endemic to south-central Oregon and has only 6 occurrences on the Forest. The species' habitat is generally characterized by open canopy and reduced competition from other plants. Populations on the Forest occur in pumice openings in lodgepole pine forest, and in and along the margins of dry or seasonally moist meadows. Short term data indicate the population in the project area is declining, as documented in Amsberry and Meinke (2003). A cooperative project with the Native Plant Conservation Program of the Oregon Department of Agriculture has been set up to study the effects of management activities on the species. Prescribed fire is one of the activities included in the study. Restoration unit 11 includes most of the Peck's milkvetch population in the project area.

The population occurs in fuel treatment units 24 through 27, and in a proposed restoration unit. An adaptive management approach will be used to determine the potential for using fire to restore or improve habitat for this species. The restoration unit will be covered in a later decision.

Another uncommon species on the Forest which occurs in the project area is the mountain lady's slipper orchid (*Cypripedium montanum*). Although not a sensitive species, lady's slipper orchids occur at only 10 sites on the Forest, in populations of 100 or fewer individuals. Lady's slipper orchids appear to prefer partial shade, but have also been observed to respond positively to burning by Seevers and Lang (1998). The species is considered to be old growth-associated within the range of the northern spotted owl. A small population is located in harvest unit 35 within the project area. Other sites in the area are located outside of proposed unit boundaries.

Past activities have not resulted in an abundance of invasive, non-native species in the project area. Noxious weeds in the area are primarily associated with roads and gravel pits, rather than timber harvest. Roads provide continuously disturbed habitat and potential for seed introduction via vehicle traffic. The largest concentration of invasive species in the project area is at Summer's gravel pit and along the 2200-130 road which accesses the pit. Diffuse knapweed, dalmation toadflax, musk thistle, and Canada thistle are present in this area. Summer's Pit is located in restoration unit 14. A 0.1 acre site of dalmation toadflax and a 0.1 acre site of Canada thistle are present in harvest unit 57, between the private land boundary and Sprague River Road. A 0.1 acre site of St. Johnswort is located along the Lone Pine Road in natural fuels unit 43. St Johnswort is also located outside of proposed unit boundaries along Forest Road 5815. Cheatgrass and bullthistle are occasional in disturbed areas throughout the project area, but are not present in sufficient abundance to displace native species. Intermediate wheatgrass has been introduced along many of the roadsides and in some of the meadows. While not invasive, intermediate wheatgrass (*Elytrigia intermedia*) is a persistent rhizomatous species which can displace native species where it has been sown. Intermediate wheatgrass is present in the meadow occupied by Peck's milkvetch and may have a negative effect on the population (Amsberry and Meinke 2003).

Effects

Alternative 1 No Action

The no-action alternative will have no direct, indirect, or cumulative effects on plant species in the project area. Alternative 1 would forego the opportunity to study the effects of prescribed fire on Peck's milkvetch. Alternative 1 would also forego the opportunity to reduce fuels and restore vegetation in parts of the project area through mechanical and burning treatments. Known invasive plant populations may still be treated under existing agreements.

Alternative 2 Proposed Action

Experimental burning of 1 acre of Peck's milkvetch habitat may result in one or more of the following effects on the species: damage to, or mortality of existing plants; stimulation of new growth and increased vigor; stimulation of seed germination; and/or stimulation of, and increased competition from, intermediate wheatgrass. Burning will

initially take place on a small portion of the population occupying approximately 2% of the existing habitat in the area. If effects are negative, no additional activities will take place in occupied Peck's milkvetch habitat, and therefore, the project may impact individuals or habitat, but would not likely result in a trend toward Federal listing or reduced viability for the population or species. If effects in the study plots are positive after 2 years of monitoring, more burning will be done in occupied habitat. Under this scenario, the project would have a beneficial impact on Peck's milkvetch.

Shade removal and ground disturbance caused by treatments in Unit H35 may impact a small population of mountain lady's slipper orchid located along the edge of the unit. This site should be excluded from the boundary of Unit H35 during unit layout. Fuel reduction treatments are likely to improve habitat for the orchid in the project area by reintroducing fire and moving stand structure towards pre-settlement conditions. Increases in lady's slipper within the treated area near the know population will be monitored.

Invasive Species

Implementation of Alternative 2 may increase the potential for invasive species spread and introduction, as a result of ground disturbance and transport of seed by off-road equipment and vehicles. Because noxious weeds are uncommon in the project area and a large seed source is not present, the risk is relatively low. Weed spread will be minimized by avoiding known sites during project implementation and application of the standard contract clause which requires cleaning of off-road equipment prior to entry onto the Forest (Appendix B). All rock used in the project should come from weed free pits. Noxious weed sites within unit boundaries will be flagged and avoided during project implementation. Landings, skid trails, slash piles, and burning will not be located in weed sites, and equipment will be kept out of these areas to the extent feasible.

Weed control is currently being implemented in the Ninemile Project Area, as described in the Winema National Forest Noxious Weed Environmental Assessment as amended. New noxious weed populations found in the Ninemile area will be added to existing of future control projects.

Cumulative Effects

As part of the Peck's milkvetch cooperative study, a one-acre burn is also planned within a large population (8000 plants, 110 acres) on the Chemult Ranger District. A biological evaluation completed for the Chemult project found the project may impact individuals or habitat, but would not likely result in a trend toward Federal listing or reduced viability for the population or species. Other than activities associated with the cooperative study, no new activities are planned within known Peck's milkvetch sites. Cattle grazing is on-going at most milkvetch sites on the Forest. The effects of grazing on Peck's milkvetch have not been studied, but observation suggests cows generally do not eat the plants. As noted before in the existing condition section, fire suppression and introduction of intermediate wheatgrass may have had negative effects on the population in the Ninemile Project Area.

No other activities are currently on-going or planned in mountain lady's slipper orchid habitat in the project area. Past activities such as logging old growth stands, road

building, and fire suppression may have been detrimental to the species.

No other vegetation management projects are currently proposed in the planning area. Traditional use plants are a diverse group which had variable response to past activities such as logging and grazing. Fire suppression and increasing tree canopy cover has resulted in reduced vigor or abundance of many of these species.

Alternative 2 may contribute to cumulative effects on invasive species introduction and spread. Past, present, and foreseeable future activities which have, or may, contribute to weed spread in the area include road construction, road maintenance, vehicle traffic, gravel pit operations, timber harvest, livestock grazing, and recreational use. Activities associated with roads and Summers gravel pit appear to have had the greatest effect.

Table 3-19. Sensitive Plant Biological Evaluation and Summary of Effects

R6 Sensitive Species Suspected or Documented on Winema	Habitat in project area	Survey Conducted	Effects of Action Alternative
<i>Arabis suffrutescens</i> var. <i>horizontalis</i>	No	No	No Impact
<i>Arnica viscosa</i>	No	No	No Impact
<i>Asplenium septentrionale</i>	No	No	No Impact
<i>Astragalus peckii</i>	Yes	Yes	May effect, NLAA or beneficial
<i>Botrychium lanceolatum</i>	Possibly	Yes	None found, no impact
<i>Botrychium pumicola</i>	Possibly	Yes	None found, no impact
<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i>	Possibly	Yes	None found, no impact
<i>Carex stenophylla</i>	Possibly	Yes	None found, no impact
<i>Castilleja chlorotica</i>	No	No	No Impact
<i>Cicuta bulbifera</i>	No	No	No Impact
<i>Collomia mazama</i>	No	No	No Impact
<i>Eriogonum prociduum</i>	No	No	No Impact
<i>Gentiana newberryi</i>	No	No	No Impact
<i>Hazardia whitneyi</i> var. <i>discoideus</i>	No	No	No Impact
<i>Iliamna bakeri</i>	No	No	No Impact
<i>Lycopodiella inundata</i>	Possibly	Yes	None found, no impact
<i>Mimulus evanescens</i>	Possibly	Yes	None found, no impact
<i>Mimulus tricolor</i>	Possibly	Yes	None found, no impact
<i>Penstemon glaucinus</i>	No	No	No Impact
<i>Perideridia erythrorhiza</i>	Possibly	Yes	None found, no impact
<i>Rorippa columbiae</i>	Possibly	Yes	None found, no impact
<i>Scheuchzeria palustris</i>	No	No	No Impact
<i>Thelypodium brachycarpum</i>	Possibly	Yes	None found, no impact

Aquatic Species and Habitat

Activities proposed under the Ninemile Fuel Reduction Project would occur within a number of subwatersheds immediately adjacent to the Sprague River. This river is occupied by Shortnose and Lost River suckers, federally listed as endangered species, as well as by a number of Forest Service sensitive species. The majority of fuel treatments under both action alternatives would occur within proposed critical habitat for listed suckers. The main aquatic concerns are the hydrologic and fine sediment impacts on listed suckers and proposed critical habitat in the Sprague River, and consistency of project design with existing management direction. These concerns are displayed in Table 3-20 below.

Lost River sucker are native to northern California and southern Oregon in the Upper Klamath Lake and its tributaries, including the Williamson and Sprague Rivers. Its present distribution includes Upper Klamath Lake and its tributaries. Lost River sucker prefer deep-water lakes and impoundments, as well as the deep pools of small to medium-sized rivers. They move from lakes into tributary streams to spawn. They deposit their eggs in swift stretches with rubble or compacted cobble substrate, preferentially on loose gravel when available. Larvae move downstream into lakes soon after hatching. They also spawn along the shore of Upper Klamath Lake at spring inflows such as Sucker Springs. Shoreline river and lake habitats appear to be important for larvae and juveniles.

Chiloquin Dam, constructed in 1928 on the Sprague River, cut off access to 95% of historical spawning habitat for the Upper Klamath Lake population and precluded accumulation of suitable spawning gravels below the dam.

Historically the Shortnose sucker was known only from Upper Klamath Lake and Lake of the Woods, Oregon. It may also have occurred in the Lost River system, but this is undocumented by specimens. Its present range includes Upper Klamath Lake and its tributaries. In the Upper Klamath Lake watershed, spawning runs primarily are limited to the Sprague and Williamson rivers, though they may also occur in the Wood River and in Crooked Creek. While formerly very abundant in Upper Klamath Lake, spawning migrations have declined significantly in recent years, due in part to alteration of habitat. Chiloquin Dam, constructed in 1928 on the Sprague River, Oregon, cut off 85% of spawning range, and recruitment has been essentially nonexistent in recent decades. A 1984 survey estimated that 2650 individuals left Upper Klamath Lake to spawn; declines were noted in the two succeeding years

Historically bull trout inhabited the lower Sycan River, remaining today only in a few headwater tributaries above the Sycan Marsh. There are also a number of small headwater tributaries of the Sprague River that are currently occupied by bull trout. There is no known historic or current use of the Ninemile Project Area by bull trout.

Redband trout populations throughout the Sprague River have been fragmented due to degraded habitat and the occurrence of artificial barriers to fish passage. Remaining resident populations are now isolated in small headwater streams, or are found in the lower ends of larger rivers, lakes, and reservoirs, where they are able to find cold water

Table 3-20. Aquatic Concerns for the Ninemile Fuel Reduction Project

<p>Hydrologic and Fine Sediment Impacts to the Sprague and Williamson Rivers and Potential for Impacts To Threatened, Endangered and Sensitive Species and Their Proposed or Designated Critical Habitat</p> <p>DESCRIPTION:</p> <ul style="list-style-type: none"> ❖ Small, incremental inputs of sediment and nutrients, and changes in timing and duration of stream flow because of road use, road maintenance, and silvicultural practices can have adverse effects on aquatic habitat. Roads can have a significant impact on the amount of sediments entering streams. Roads and other associated forest practices (e.g. timber/fuels treatments, yarding, landings) may affect watershed function by compacting soils, reducing water infiltration; channeling water, reducing infiltration, and blocking subsurface flows, thus altering the timing of flows. Water temperature of tributary streams is increased when riparian vegetation is removed, or not restored, and when catchments fail to function normally. The Sprague River is listed by the State of Oregon DEQ as 303(d) for summer pH, summer dissolved oxygen and summer temperature. <p>RECOMMENDED ACTIONS:</p> <ul style="list-style-type: none"> ❖ Identify and modify land management activities (upland and riparian) that have the potential to contribute sediment or reduce shade in tributaries to spawning and rearing areas in order to prevent increases in sediment levels, nutrients, and water temperatures. ❖ Identify and modify land management activities (upland and riparian) that have the potential to adversely affect hydrologic function to assure that aquatic conditions meet management objectives. ❖ Provide adequate riparian buffers to capture sediments that result from land management activities (roads or forest practices). ❖ Reduce road densities where they route runoff to stream channels and threaten to decrease stream channel bank stability. <p>UNITS OF MEASURE:</p> <ul style="list-style-type: none"> ❖ Decrease or no net increase in soil loss from surface disturbing land management activities. ❖ Indices of channel stability (e.g. changes in channel form, scour depth, substrate transport, percent unstable stream banks, percent vegetative cover).
<p>Project Consistency with INFISH Conservation Strategy</p> <p>DESCRIPTION:</p> <ul style="list-style-type: none"> ❖ This issue relates to designing activities to meet the goals and objectives of the applicable aquatic conservation strategy. <p>RECOMMENDED ACTIONS:</p> <ul style="list-style-type: none"> ❖ Apply applicable INFISH standards and guidelines and riparian goals and objectives to ensure that proposed actions are fully consistent with the intent of the aquatic conservation strategy. ❖ Identify and modify land management activities (upland and riparian) that have the potential to contribute sediment to spawning and rearing areas above natural levels to prevent elevated levels of sedimentation and nutrients. <p>UNITS OF MEASURE:</p> <ul style="list-style-type: none"> ❖ Hydrologic connection, roads, and facilities to the River (Eliminate, Reduce, No Change). ❖ Risk of sediment in River (Relative Scale: High/Moderate/Low)

refugia during critical summer months. Redband trout do not current ascend or occupy any streams entering the lower Sprague River from the project area. They are present in the lower Sprague River. There is no redband trout spawning in any streams entering the lower Sprague River from the project area.

The Pit-Klamath brook lamprey prefers habitats of creeks, pools/riffles, and springs. Their principle habitat seems to be cool, clear, streams or springs with sandy-muddy

bottoms or edges. They are often found in the same habitats occupied by sculpins, suckers, and speckled dace. Its principal habitat seems to be cool, clear streams or springs with sandy-muddy bottoms or edges. The historic range is not well understood. Beyond being non-parasitic, apparently resident, and with filter feeding ammocoetes (juvenile life stage) the life history of this species is largely unknown. They do not occupy any of the streams tributary to the Sprague River emanating from the project area.

The adult Klamath River lamprey are parasitic on fishes, attaching and feeding on body fluids. The larvae are filter feeders, feeding on microscopic plant and animal material. Its preferred habitats include large rivers, impoundments behind dams, and lakes. The adults probably spend most of their time in Upper Klamath Lake. They spawn in gravel riffles of tributary streams, generally far enough upstream so that there is adequate larval habitat (silty, muddy backwaters) downstream from the spawning area. Habitat near the headwaters of the Sprague River would have been ideal for spawning, while the lower reaches of these rivers would have provided habitat for the young. They do not occupy any of the streams tributary to the Sprague River emanating from the project area.

Slender sculpin have a small range in lakes and tributaries streams in Oregon. The historic distribution includes Upper Klamath Lake, the Sprague River outside of Chiloquin and two records from the Sprague River near Beatty. Slender sculpin appear to inhabit or migrate through Upper Klamath and Agency Lakes on an irregular basis, except at a few springs found in Upper Klamath Lake where they are rear round residents. Like the historic range, the current range of slender sculpin populations is not completely understood, as they are difficult to collect and have not been extensively surveyed. They are believed to be restricted to Upper Klamath and Agency Lakes and their tributaries. They are generally abundant where found, but the range has been reducing in size. They are known to utilize both pool and riffle habitats in creeks and medium sized rivers with moderate gradients. In lakes they utilized both deep and shallow water habitat. There is currently little ecological information available on this species. They seem to prefer mud, sand and gravel on lakeshores, riffles, runs and pools of creeks and small to medium rivers. They do not occupy any of the streams tributary to the Sprague River emanating from the project area.

Blue chub are widely distributed and were at least formerly one of the most abundant fishes in the Klamath and Lost river systems of Oregon and California. Population increases were seen in Upper Klamath Lake in the 1990s; and they were doing well in reservoirs despite the presence of introduced, predatory fishes. No systematic estimates of past or present abundance have been made. They prefer the rocky pools of creeks and small to large rivers, rocky shores of reservoirs and lakes. Blue chub feed mainly on aquatic insect larvae, cladocerans, and filamentous algae. They do not occupy any of the streams tributary to the Sprague River emanating from the project area.

Effects

Activities proposed under the Ninemile Hazardous Fuels Reduction Project would result in less sediment entering the Sprague River, improve stream channel bank stability, and reduce the risk of stand-replacement fire, reducing the risk of high peak flows. All of

these actions would contribute to improvement of water quality and habitat conditions for the species listed above in the Sprague River.

A summary of the effects on the aquatics concerns shown in Table 3-20 are shown below in Table 3-21.

Table 3-21. Aquatic Concerns Summarized by Alternative

Aquatics Concern	Alternative 1 No Action	Alternative 2 Proposed Action
Risk of Sedimentation		
Short-term	Low	Low (Reduce)
Long-term	Moderate	Low (Reduce)
Hydrologic Connection		
Short-term	No change	Reduce
Long-term	Degrade	Reduce
Consistency with INFISH		
Short-term	No	Yes
Long-term	No	Yes
Relative Support for INFISH		
Short-term	Low	Moderate
Long-term	Low	High

Alternative 1 No Action

Under No Action only routine maintenance and repair of existing road facilities would occur. There would likely be opportunities from time to time to replace or upgrade road/stream crossings and improve road surface drainage. However, there would be no direct intervention through management activities to restore and maintain broad-scale ecosystem health inside the Wildland Urban Interface (WUI). There would be no attempt to reduce the current risk of uncharacteristically severe wildfire, or to achieve overall consistency with the Winema Land and Resource Management Plan (LRMP), as amended. Current conditions presenting a high fire hazard because stand densities, accumulated natural fuels, brush densities, and other components that contribute to fire intensity and spread would continue into the foreseeable future.

No timber harvest, non-commercial tree removal, mechanical fuels treatments such as brush mowing or slashbusting, prescribed burning, or other treatments would be used to accomplish fuels reduction. Recommended elements of existing Biological Opinions, species recovery plans, and the Water Quality Recovery Plan (WQRP) for the Sprague River would not be implemented. Current conditions would be maintained.

Fuels and vegetation treatments would not occur. Upland and riparian area vegetative conditions would continue to deteriorate, increasing the potential for a large, catastrophic fire. Such a fire were it to occur, would burn large sections of proposed critical habitat for listed suckers. Impacts from a large stand replacing fire would not support ongoing recovery efforts for these species.

The No Action alternative would not be consistent with the need to improve habitat for TES fish species. Recent wildfires in these fuels types have been seen to burn at uncharacteristically high severities, killing a majority of the trees that used to survive the frequent, low intensity fires that were the historical norm. Surface soils could be severely damaged and could take many years to recreate. High soil erosion rates could occur in some of the planning area following an intense post-fire precipitation event. This alternative would result in maintaining a high risk to stream channel process and function. The No Action alternative proposes no new fuels projects during this planning cycle.

The meadows, riparian and non-forest lands would continue to deteriorate with encroachment of juniper, conifers, and fuel accumulations. Stream channels that are encroached upon by conifer will continue to become more shaded, further reducing the brush component along stream channels resulting in a decrease in streambank stabilities and more fine sediment runoff into stream channels.

No activities would occur within default riparian reserves (as defined by INFISH) along the Sprague River and perennial portions of Copperfield Draw. Existing fuels loadings would remain high, as would the risk of stand replacement fire. Loss of streamside vegetation near the Sprague River as a result of not treating adjacent stands could result in the loss of shade producing vegetation, increasing stream temperatures, which are already a limiting factor under 303(d) rules. While intermittent stream channels in the project area only flow during the earliest part of the runoff season, a complete loss of shading vegetation due to wildfire could result in temperature increases to Copperfield Draw and the Sprague River. Large increases in sediment yield from the tributaries to the Sprague River could act incrementally to widen and shallow the Sprague River, resulting in incremental temperature increases as a result of opening up more water surface to the warming effects of the sun. As water warms it has less ability to hold dissolved oxygen. There is potential to adversely affect dissolved oxygen levels by incrementally increasing water temperatures as described by the processes above.

Roads and other associated forest practices such as skid trails and landings can affect watershed function by compacting soils, channeling water, reducing infiltration, blocking subsurface flows, thus altering timing of flows. Improvements to the road system would continue to occur, but it is unclear at what rate as this would be subject to available funding. Since there would be no planned commercial treatments of timber stands, the road maintenance needed for timber haul would likely not occur (culvert replacements, surfacing, installation of drainage structures, road closures). Known sediment sources would not be addressed and needed culvert repairs would not necessarily occur in the short-term, delaying recovery of key elements of watershed restoration.

The only possible source of contaminants would be from fuel spills related to implementation of management activities. This risk, while low, is lowest for the No Action Alternative as there would be no planned timber haul, and only limited use of

heavy equipment over an unknown period of time for restoration activities. The use of such small fuel volumes would be mitigated by use of standard spill containment plans routinely a part of work contracts.

The No Action Alternative would not remove any riparian vegetation, particularly any source of existing or future shade or large woody debris adjacent to the mainstem Sprague River. By maintaining the current level of risk to shade (stand replacement fire) there is potential for adverse effects to existing stream temperatures and sediment levels which could result in decline in the quality of refugia for TES fish species. A stand replacement fire in Ninemile could result in an increase of fine sediment to known spawning, rearing, and feeding areas.

The No Action alternative will maintain existing conditions for environmental factors such as nutrients and sediment levels. Project analysis indicates that current road densities for the planning area remain above the desired levels in the Winema LRMP. Stream channel stability in tributaries to Copperfield Draw, while mostly stable are at a threshold indicating corrective action is needed. Current road density should be reduced, particularly around Copperfield Draw. Identified road segments adjacent to the lower Sprague River should have culverts upgraded, road surfacing, and road ditches treated to reduce known sediment sources. Area road closures will not be addressed in this decision document.

Cumulative Effects

ESA cumulative effects are those on species caused by other projects and activities unrelated to the action being considered. The environmental baseline has been discussed in detail. The No Action Alternative would not make scheduled improvements to the environmental baseline. Rather, it would maintain existing conditions in the federal portions of the sub-watersheds, some of which are causing adverse effects on habitat for listed and sensitive fish species.

A large-scale restoration project on private land is planned for the lower Copperfield Draw beginning in 2005. The US Fish and Wildlife Service Ecosystem Restoration Office is conducting restoration of wetlands, development of conservation easements, and other restoration on private lands along the Sprague River.

The USFWS and State of Oregon have been completing screening of water intakes along the Sprague River on private lands. Additional restoration work is known to be occurring on private lands along the Sprague River through NRCS review and mitigation of private lands operations. The overall condition of habitat in the Sprague River is improving and will continue to do so for the foreseeable future.

Over the past four years the overall condition of the sub-watersheds has been improved by a number of Forest Service actions such as the 1999 10% Fund Projects and the Copperfield Draw Headcut Restoration Project. None of this recent restoration occurred within habitat currently occupied by TES fish species. The reduction of sediment yield and nutrients to proposed critical habitat and occupied habitat in the lower Sprague River should work incrementally to improve existing aquatic conditions. Since Alternative 1 proposes to maintain existing conditions, No Action would not result in any further improvements to habitat for TES fish species downstream of the project area.

Effects Summary Alternative 1 No Action

There are no proposed fuels treatments under Alternative 1. There would be no timber harvesting or other fuels reductions, therefore no change to overstocked timber stands or stand densities in the short-term. In the long-term and in the absence of a large fire, stand densities will continue to increase. Alternative 1 would not respond to the identified aquatic concerns in Table 3-20. It would allow for incremental degradation of existing riparian and water quality conditions by not treating road segments and failing culverts known to be causing fine sediment introductions to the lower Sprague River. Under No Action, current levels of hydrologic connectivity between roads and stream channels will be maintained. Road densities would remain unchanged. Chronic sources of fine sediment will continue to adversely affect habitat for TES fish species. Nutrient inputs as a result of fine sediment leaving the road systems will remain at elevated levels. Riparian vegetation will continue to decline in condition and be degraded. Stream channel stability will not be improved. Aquatic habitat conditions, on-site and downstream, for TES fish will continue to be degraded, though incrementally. The lack of scheduled watershed restoration activities would not result in accomplishment of the goals set forth in Biological Opinions, species recovery plans, and other management direction. For further details, please refer to the Aquatics Specialist Report in the Project Record.

Alternative 2 Proposed Action

Vegetation Management

Harvest units include commercial harvest of thinning from below, between 4 and 21 inches DBH. All trees larger than 21 inches DBH will be retained unless there is an over-riding safety concern with a particular tree. Fuels created by timber harvest will be treated by yarding tops attached to the landings, limbing, piling, and burning. Other post harvest fuels reduction treatments will include, as appropriate, whip falling of excess 0 to 4 inch diameter trees; machine piling of whipfall concentrations if needed, and burning of the machine piles if created; machine mowing or slashbusting of the existing brush; and a mosaic underburning of the accumulated natural fuels. Some units may have slashbusting on slopes over 25% and machine piling on slopes under 25%. Underburning and slashbusting will retain approximately 30% of the existing bitterbrush in treated units with bitterbrush as the main brush species present. Up to 100% of the units occupied by manzanita or ceanothus brush will be treated.

Natural fuels units include no commercial harvest. These units include, as appropriate, whip falling and/or pre-commercial thinning of excess 0 to 8 inch DBH conifer stems; hand piling of whipfall concentrations and burning of the hand piles if created; jackpot burning of unpiled whipfall concentrations; machine mowing or slashbusting of the existing brush combined with a mosaic underburn of the accumulated fuels. Underburning and slashbusting will retain approximately 30% of the existing bitterbrush in treated units. Up to 100% of the units occupied by manzanita/ceanothus brush will be treated. Only the operations needed for a particular unit or portion of a unit will be done.

Road Related Activities

The existing transportation system was primarily developed for timber harvest. It has been maintained through timber harvest and capital investment programs. With the reduction in the timber harvest program and funding for capital investment, current road conditions have slowly deteriorated in the project area due to deferred levels of maintenance. The consequences of this deferred maintenance include: brush encroachment into the roadway and ditchline, ditchline blockages due to slope ravel and brush encroachment, loss of road surfacing, rutting of the road surface due to use during periods of limited-strength capacity of the road (i.e. saturated subgrade). Operations outside the normal operating period (typically June 1 – Nov 1) have resulted in rutting of the roadway due to low support strength in saturated soils. These ruts intercept and redirect surface drainage, resulting in a loss of road surfacing to nearby stream channels. Needed reconstruction for planned activities would consist of: roadside brushing, ditchline and culvert cleanout, spot-resurfacing the traveled way with crushed aggregate, stabilization of soft spots, and construction of new drainage features to achieve a self-maintaining condition. The desired road management strategy for Maintenance Level 1 and 2 roads would be to move these roads towards a “self-maintaining” condition. The needed reconstruction and maintenance is discussed in the Roads and Transportation System section of Chapter 3. From an Aquatics standpoint the needed road maintenance is assumed to be accomplished prior to timber harvest in Alternative 2. All temporary roads and landings will be obliterated following use.

Effects

Recent wildfires in the Ninemile Area have been seen to burn at uncharacteristically high severities, killing a majority of the trees that used to survive the frequent, low intensity fires. Alternative 2 proposes actions to reduce wildfire risk to stream channel processes and function by treating these stands before a stand replacement fire occurs. Fire suppression after treatments will have a higher probability of success. Proposed fuels and vegetation treatments would move upland and riparian areas back towards historic conditions while reducing the potential adverse effects on habitat for TES fish species. Reduction of risk to populations of TES fish would support ongoing recovery efforts for these TES fish species and is consistent with the need to improve habitat for TES fish species. Surface soils will be less damaged in the event of a fire and soil erosion would be much less severe, especially if followed by an intense post-fire precipitation event. This would reduce the risk of adverse hydrologic, cumulative effects. Meadows, riparian and non-forest lands would show improvement with removal of encroaching juniper, conifers, and fuel accumulations. Stream channels that are encroached upon by conifer would be opened up, increasing the brush component along stream channels resulting in a increase in streambank stabilities and less fine sediment erosion.

No activities would occur within INFISH riparian reserves along the Sprague River and perennial portions of Copperfield Draw. INFISH calls for buffers of 50 feet slope distance along intermittent streams to exclude machinery. No mechanical entry will occur within 25 feet of the edges of stream channels, but thinning or fuels treatments may occur within the 50-foot buffer. These treatments will benefit riparian brush species by removing competing conifer, enabling brush species to flourish. This will allow additional bank stabilizing vegetation to establish on unvegetated banks. These and

other resource protection measures may be seen in Appendix B. The Ninemile activities proposed will be consistent with the Winema LRMP, as amended by INFISH.

Only a small portion of shade would be removed in the short-term, with the shade value quickly regained through accelerated growth on the trees left in place and through development of the understory brush component. The short-term loss of some shading vegetation along the intermittent stream channels would not result in significant cumulative effects to water temperatures in the Sprague River given the seasonality of flows in this area. Existing fuels loadings in adjacent stands would be reduced, along with the risk of stand replacement fire. This would be expected to result in a higher probability of maintaining shade-producing vegetation along the Sprague River, an action consistent with recommendations in the Water Quality Restoration Plan. There is only a very brief period of snowmelt runoff from these stream channels and this occurs at a time of the year when water temperatures are not a critical issue in the Sprague River. The expected increase in brush species as a result of treatments would quickly mitigate for the short-term, partial loss of conifer shading, as would the increase in size of the remaining large diameter trees.

Known sediment sources would be mitigated through the proposed road reconstruction and maintenance. Roads and other associated forest practices such as skid trails and landings can affect watershed function by compacting soils, channeling water, reducing infiltration, blocking subsurface flows, thus altering timing of flows. Improvements to the road system as described in the Roads section of Chapter 3 would be implemented. It is expected that there would be some improvement to hydrologic condition. Road maintenance needed for timber haul would be assured (culvert replacements, surfacing, installation of drainage structures, road closures). Known sediment sources and needed culvert repairs would be rehabilitated prior to timber haul activities. They would be scheduled and implemented aiding recovery of watershed condition. Without such treatments incremental increases in sediment yield from these tributaries to the Sprague River could act to widen and shallow the Sprague River opening up more water surface to the warming effects of the sun. The balance of the proposed treatments is not expected to add incrementally to existing sediment levels, as they will not occur adjacent to stream channels and will not be of an intense enough nature to result in surface flows of sediment.

The only possible source of contaminants would be from fuel spills related to implementation of management activities. This risk is very low, especially since most activities will occur during the dry season when stream channels are dry. The use of such small fuel volumes would be mitigated by use of standard spill containment plans routinely a part of work contracts. Spills would be most likely when they would easily be mitigated. In addition, there are no TES fish species within the immediate project area.

Alternative 2 would not remove any riparian vegetation, particularly any source of existing or future shade or large woody debris in upland stands in proximity to the mainstem Sprague River. It would, however, manage vegetation along intermittent tributaries that have seasonal connectivity to such refugia. These treatments would have insignificant impacts in the short-term, and are expected to result in improvements to occupied habitat in the longer term through improving bank stability and reducing sources of fine sediment and nutrients. Reduction of risk for a stand replacement fire would result in a decrease in the likelihood of heavy generation of fine sediment to

known spawning, rearing, and feeding areas. The Project will maintain or improve conditions that lead to the listing of the Sprague River as a 303(d) water body. Actions proposed in Ninemile are consistent with those recommended in the South of Sprague Watershed Assessment (1995) and with the Upper Klamath Basin Water Quality Restoration Plan (2003).

Project analysis indicates that current road densities for the planning area remain above the desired levels in the Winema LRMP. Current permanent road density should be reduced, particularly in Copperfield Draw vicinity, but such reduction is not part of this analysis. Stream channel stability in tributaries to Copperfield Draw, while mostly stable, is at a threshold indicating corrective action should be taken. Temporary road construction will have a negligible effect in both the short- and long-term if obliterated after project use.

Cumulative Effects

ESA cumulative effects are those on species caused by other projects and activities unrelated to the action being considered. A large-scale restoration project is planned for lower Copperfield Draw beginning in 2005. This project will address two headcuts, which exist at the uppermost end of the ownership, thus ensuring that stream channel degradation does not extend up the channel to Forest Service lands. In restoring a watershed and its values, it is critical to involve all interested parties, from the federal agencies to adjoining private landowners. This new project will address fish passage upstream to the Winema National Forest, which owns about 90% of the Copperfield Draw Watershed. The major water quality issues in the Copperfield Draw Watershed, as outlined in the Copperfield Draw Suspended Sediment Study (USFS 1999), occur on private lands. Upstream water quality is good. Completion of the Ninemile Project will contribute to fully addressing watershed restoration in the entire watershed.

The Winema NF has restored and upgraded some roads and culverts in the watershed. In addition, meadows have been rehabilitated and wetlands restored. By restoring watershed form and function, soil erosion, degraded water quality, and loss of rangeland productivity have been reduced. Recovery of listed species has been addressed by improving spawning habitat for the endangered Lost River and shortnose suckers. Watershed restoration has resulted in improved water quality and addressed part of the TMDL issues for the Sprague River and Upper Klamath Lake.

The USFWS Ecosystem Restoration Office is currently conducting restoration of wetlands, development of conservation easements, and other restoration on private lands along the Sprague River. A number of private landowners in the watershed have recently completed riparian projects that address watershed functions through working with the Ecosystem Restoration Office.

The USFWS and the State of Oregon have been completing screening of water intakes along the Sprague River. Additional restoration work is known to be occurring on private lands along the Sprague River through NRCS review and mitigation of private lands operations. Therefore, it is believed that the overall condition of habitat in the Sprague River is improving and will continue to do so for the foreseeable future.

Over the past four years the overall condition of the sub-watersheds has been improved

by a number of Forest Service actions and private lands improvements. Further reduction of sediment yield and nutrients to proposed critical habitat and occupied habitat in the lower Sprague River and Upper Klamath Lake would incrementally work to improve existing aquatic conditions. Alternative 2 proposes further improvements to existing conditions and would result in further improvement in aquatic habitat and for TES fish species downstream of the project area.

Threatened, Endangered, and Sensitive Aquatics Species

Effects

Determinations of effects for threatened, endangered, and sensitive fish species are shown in Tables 3-22 and 3-23. None of the alternatives will cause a trend towards federal listing or a loss of viability of any of the species addressed. It is the determination of the Project Fisheries Biologist that implementation of Alternatives 2 will have “No Effect” on Shortnose sucker, Lost River sucker, and bull trout; implementation of Alternative 2 is “ Not likely to Result in the Destruction or Adverse Modification of Proposed Critical Habitat for the shortnose sucker, Lost River sucker, and bull trout”; and implementation of Alternative 2 will have “No Impact” on Region 6 sensitive fish species. While Alternative 2 project effects will improve a number of habitat variables, incrementally they do not rise to the level of a “beneficial effect”.

Table 3-22. Aquatics Sensitive Species Biological Evaluation Summary

Species	Alternative 1 No Action	Alternative 2 Proposed Action
Pit-Klamath Brook Lamprey	Note: Please see the discussion section in Aquatics for the No Action Alternative	No Impact
Klamath River lamprey		No Impact
Slender sculpin		No Impact
Blue Chub		No Impact
Klamath Largescale sucker		No Impact
Interior Redband trout		No Impact

Table 3-23. Aquatics Listed Species Biological Evaluation Summary

Species	Alternative 1 No Action	Alternative 2 Proposed Action
Lost River sucker	Note: Please see the discussion section in Aquatics for the No Action Alternative	No Effect
Shortnose sucker		No Effect
Bull Trout		No Effect

Soils

Current Condition and Past History

The Ninemile Fuels Reduction Project occurs across fire adapted ecosystems on sandy surface B and H group soils that support needle grass, fescue, bitterbrush, manzanita, and ponderosa pine plant communities as described in Carlson (1979) and Hopkins (1979). The B and H soils have dark litter accumulation features associated with grassy ground cover and low-density crown cover habitat. The semiarid grassy forests and soils are adapted to the historical norm of cool ground fires that tend to keep fuel loads in check. Currently most of the area departs from the historic balanced grassy park-like stands with well spaced pines. The Ninemile Project Area is dominated by conifer vegetation and the resulting heavy fuels. Only 13 percent of the project area is in moderate fuel hazard and 8 percent is in low hazard. Most of the forest communities have become high fuel hazards with increases in crown cover, tree density, and fuel loading.

Wildfires have the potential to create unacceptable soil heating. Current fuel loads are sufficient to heat the soil and burn off nitrogen, an essential nutrient. Fuel loadings above 20 tons/acre, when burned in a wildfire situation, will exceed the nitrogen volatilization temperature of 200 degrees Centigrade (Brown et al. 2003, DeBano et al. 1998, Johnson et al. 1998). Much of Ninemile exceeds the 20 tons/acre fuel loading, and wildfire should cause similar effects to those described in the literature above.

Historically, the B and H soil terrains in grassy pine forest conditions had low fuel loads, which may range from 5 to 13 tons/acre (Brown et al. 2003). In these conditions soil heating from fires is apt to be less than 100 degrees C. The vegetation was more balanced between trees, shrubs, and grasses than the current structure. The Ninemile Project will reduce fuel loads and restore forest structure. This will result in cooler ground fires that conserve soil nitrogen.

Pretreatment soil assessments were conducted in the Ninemile Project Area. A total of 47 transects were taken within proposed Ninemile units. An additional 28 transects were sampled in similar soils where past harvest activities had occurred for comparison. Each survey plot along the transects was evaluated to determine soil disturbance and growth limiting compaction. A planting spade was used to determine underground vegetation, compaction and puddling, and displacement of the "A" horizon.

Soil assessment surveys found that both detrimental compaction and displacement were within Regional guidelines. No transect in the Ninemile Project Area exceeded the Regional standard.

Only one of the 28 transects done in the adjacent harvest areas samples exceeded the 20 percent limit in compaction factors. The majority of soil factor hits were in classes 2 and 3 in the prior harvest treatment areas. The older harvest units sampled were logged with larger equipment to handle larger trees, and included machine piling to dispose of the logging slash. Generally speaking, the soil effects on Ninemile should be less than those displayed in the comparison areas sampled.

The soil transect data and the complete soils specialist report may be seen in the

Ninemile Project Record.

Effects Common to All Alternatives

Wildfire will detrimentally affect soil productivity should it occur with the fuel loadings that exist today. Wildfire can result in the loss of organic matter, loss of soil structure, hydrophobicity, and erosion; chemical effects of lost nutrients through volatilization and leaching; and biological effects of loss of soil organisms and their habitat. Other potential effects to soils following wildfire include those associated with fire suppression efforts and salvage operations. Wildfire effects to the soil resource will vary by soil type and fire intensity. Fire intensity can be controlled somewhat by the proposed treatments in the action alternative.

Alternative 1 No Action

In the short and the long term, continued soil health will depend on whether or not the area is subjected to uncharacteristically severe wildfire. In the absence of wildfire, no additional detrimental soil impacts are likely to occur.

Alternative 1 would not meet the Purpose and Need of the Ninemile Project of reducing fire hazard. Given the existing fuel conditions, fire risk and past fire occurrence in the Ninemile area, a severe wildfire is likely to occur, with the attendant soils effects. Almost 80% of the Ninemile area now has a high fire hazard. Without treatment, even more of Ninemile will fall into the high fire hazard category as fuels accumulate. There could be additional detrimental effects from suppression efforts, and possibly from salvage logging. The No Action alternative puts the greatest number of acres at risk for detrimental soil impacts associated with wildfire.

Alternative 2 Proposed Action

The action alternative proposes extensive use of heavy equipment for brush treatment (mowers or Slashbusters), piling of precommercial thinning slash (dozers), harvest (mechanical fallers, skidders) and fireline construction (dozers, line plows). All of this equipment has the potential to cause detrimental soil disturbance through excessive compaction and displacement of project area soils. Activities that result in detrimental soil conditions can indirectly lead to lost soil function and productivity. Soil compaction, for example, can lead to reduced site productivity by reducing water infiltration, root penetration, aeration, moisture storage, and soil microbial activity. Soil displacement can lead to reduced productivity, increases in stream sediments, and spread of noxious weeds.

Careful use and administration of Best Management Practices (BMPs) during unit layout and machine activities has been effective in limiting the detrimental effects of machinery and keeping the detrimental soil disturbance within Regional guidelines. Best Management Practices to be used on this project are shown as standard operating procedures in Appendix B. By following project design, INFISH guidelines, BMPs and soil protection measures, impacts to soils within the project area are not expected under the action alternative.

The BMP for general ripping is not advised, as the anticipated grassy ground cover

recovery (Malaby 2002, Sexton 1998) should moderate and ameliorate any site compaction. This was demonstrated in the Lone Pine Fire area in data collected by Sexton (1998) and Malaby (2002). Ripping puts the forest trees selectively retained at risk from mechanical root damage and infection. Ripping should be restricted to the rehabilitation of landings and the main skid trails immediately adjacent to the landings.

Underburning is not expected to detrimentally affect soils. Nutrients may be released following typical cool underburns that were unavailable to plants in the unburned material. There will be a short term loss of nitrogen as it volatilizes in consumed fuels. This will be followed by an increase in available nitrogen as nitrogen-fixing species become established in areas opened up by burning, ultimately providing an increase in overall site productivity. Some detrimental soil effects such as structure changes may occur due to prolonged high temperatures associated with large down fuel sources such as logs, stumps, and slash piles. These effects can be minimized by careful adherence to prescription parameters, such as heavy fuel moisture content. Fall burning may have more detrimental soils effects than spring burning.

Soil functions will improve as fuel reduction treatments reduce the dominance of conifers. Forest structures will approach the more balanced vegetation prevalent historically in the grassy forest habitat. Over the long-term forest tree growth and soil processes are aided by open forest symmetry with well-developed ground vegetation (Busse et al. 1996). Well-rooted needlegrass ground cover will improve the current litter detritus food webs and soil microbial transformations within forest canopy openings. Areas treated by harvest, whipfalling, and machine mowing to reduce or rearrange fuels will have less soil effects during underburning operations and during summer wildfires. This was examined by Robichaud et al. (2000), who found lower soil heating, low to moderate burn severity and rapid native vegetative recovery in wildfire and prescribed burn areas that had previously been treated to reduce fuels, as is proposed in Ninemile areas.

Generally healthy forest soil conditions should occur in the B and H soils on the treated acres. Soils will operate more effectively for water catchment. The creation of forest openings and the establishment of a more balanced tree and ground cover condition will result in openings where snow pack can accumulate. With more ground cover than canopy cover, soils should moderate drought stress as well as wind and water erosion.

The action alternative will reduce the existing fire hazard on almost half of the Ninemile area. This will reduce the acres susceptible to the intense summer wildfires that can cause detrimental soil effects. Wildfire will not be eliminated, but the application of the treatments in the action alternative will result in smaller, more easily suppressed wildfires within the overall Ninemile Project Area. There will be less of a threat of future soil impacts from wildfire in the area with treatment that if the no action alternative is selected.

Old Growth

Past History and Current Condition

The pine and pine associated old growth was inventoried in 1990 on the Winema

National Forest. Lodgepole pine was not inventoried in 1990, but was estimated by the District Silviculturist for this analysis. Figure 3-13 displays the location of the existing old growth in Ninemile. The existing acres of old growth and the percentage of each timber type in old growth within the Ninemile area is shown in Table 3-24.

Table 3-24. Ninemile Old Growth Current Condition

Timber Type	Acres	Percentage of timber type as old growth	Percentage of Ninemile Area as old growth
Ponderosa pine	1067	7%	6%
Pine associated	551	69%	3%
Lodgepole pine	195	74%	1%
Totals	1813		10%

Current stand conditions in old growth follow those described in the Silviculture section of Key Issue # 1 and shown in Table 3-5. Tree vigor is low, and conifer growth rates are slow due to heavy stocking levels. There are no areas remaining of the single storied large tree Late or Old Structure Stands (LOS) in Ninemile. All of the existing old growth is multi-storied in structure, with full fuel ladders and heavy fuel loadings. Lodgepole pine, in the absence of stand maintenance fire, has greatly increased its representation in old growth. It now has 74% old growth today vs. 7% to 21% single and multi-storied LOS historically. All lodgepole LOS is now multi-storied. All remaining old growth, regardless of timber type, is at risk from uncharacteristically severe wildfire. Wildfire would kill 80% or more of any stand burned and set burned areas back to the stand initiation early structural stage.

Effects

Alternative 1 No Action

No fuel reduction activities or stocking control would take place. Multi-storied old growth would continue to accumulate vegetation and fuels. Growth rates would continue to slow as vegetation increased, stressing all live trees. Older, larger trees would be particularly at risk from moisture competition from the younger understory vegetation. Insects and diseases operating at endemic levels will kill some trees, but not enough to reduce overall stand stocking and provide significant stand release. There is a possibility that bark beetles will begin epidemic levels of infestation, killing substantial numbers of trees, beginning with the older, more stressed individuals. Under either scenario, old growth stands are likely to return to the middle structural stage of multi-strata without large trees, that is, they will no longer have sufficient large tree structure to be considered as old growth.

Fuel and fuel ladders will remain, and conditions would get worse over time as trees died from insects or competitive stress. The stands, already in the high risk category from both a fuels and silvicultural standpoint, would not improve. Summertime wildfires would almost certainly kill a majority of the vegetation in the old growth stands and change the stands to early successional structures.

Alternative 2 Proposed Action

The majority of the harvest and natural fuels treatments are proposed in the ponderosa pine type. The treatments are designed to move structural conditions from the existing multi-storied condition toward the historic single storied LOS where fire can function as a maintenance tool rather than as a stand replacement event. The understory conifers (under 21” DBH) will be thinned, excess small trees will be whip felled, and the brush and slash will be treated. Underburning will be used to treat the accumulated natural fuels.

Approximately 52% (554 acres) of the ponderosa pine old growth will be moved from high to low risk from insect and disease through the application of harvest and other fuel reductions. Approximately 57% (609 acres) will be moved from a fire Condition Class 3 to 1, which includes both the harvested areas and some acres of natural fuel only treatment. Pine associated stands were not present in the Ninemile Area historically. Approximately 55% (302 acres) of these stands will be moved toward the single-storied, open park-like pine stand that existed historically. Ponderosa pine will increase in dominance in these stands due to leave tree selection. Approximately 55% (302 acres) of the pine associated old growth will be moved from high to low risk from insect and disease and moved from a fire Condition Class 3 to 1. No activities are proposed in the lodgepole old growth. Table 3-25 displays the old growth acres and percentages proposed for treatment in Alternative 2 of Ninemile.

Table 3-25. Old Growth Proposed for Treatment in Alternative 2

Timber Type	Harvest/ Natural Fuels OG Acres treated/%	Natural Fuels only OG Acres treated/%	Total Treated OG Acres/%
Ponderosa pine	554 ac / 52%	55 ac / 5%	609 ac / 57%
Pine associated	302 ac / 55%	0 ac / 0%	302 ac / 55%
Lodgepole pine	0 ac / 0%	0 ac / 0%	0 ac / 0%
Totals	856 ac / 47%	55 ac / 3%	966 ac / 53%

Cumulative Effects

The Ninemile Fuel Reduction Project is part of a landscape approach to protect and enhance old growth. Five past NEPA decisions will, or have treated 4960 acres of old growth. Two future decisions are proposed to treat an estimated 2655 acres of inventoried pine and pine associated old growth. On a landscape basis, in seven project areas totaling 108746 acres there are 19414 acres of inventoried old growth, of which 7615 acres are proposed for treatment. No designated old growth (Management Area 7), areas set aside for specific habitat needs, are proposed for treatment.

All fuel reduction treatments in ponderosa pine and pine associated stands, including harvest, will be implemented to meet the intent of the Winema LRMP (1990) as amended by the Eastside Screens, where treatment would move existing stands toward missing or under-represented structural stages. The treated old growth stands will be more sustainable over time and will have lower losses due to fire, insects, and disease. Fire in particular will change in the treated stands from a stand replacement function to

a stand maintenance function as the fuel loads are reduced, fuel ladders eliminated, and the fire hazard is reduced. The untreated Inventoried Old Growth is still susceptible to losses from competition, fire, insects, and disease. Figure 3-9 displays the past, current, and future project areas where old growth has been treated. Table 3-26 shows the acres of old growth treated in Ninemile and in other project areas.

Table 3-26. Existing and Treated Old Growth in Current, Past, and Future Project Areas.

Project Area	NEPA Date	Project Area Total Acres	Existing PP & PA Old Growth Acres	Old Growth Acres Treated
Dorf	12/13/95	7020	1757	120
Ranch House	09/12/97	11422	2739	1326
Bayhouse	12/16/98	14389	2244	1007
Yosshouse	04/20/01	20600	4636	2102
Millhouse	08/01/01	17409	2059	405
Ninemile	06/01/04	18487	1618	911
Ninemile North	07/01/05*	19419	4361	1744*
Totals	* = estimated	108746	19414	7615

Air Quality and Smoke Management

Smoke management is defined as the policies and practices implemented by resource managers directed at minimizing the amount of smoke entering populated areas or impacting sensitive air sheds. There is a standard framework of requirements and procedures for managing smoke from prescribed fires in compliance with the National Ambient Air Quality Standards, and State and local laws. The effects of smoke management from activity created fuels on the surrounding area are described below and the procedures and guidelines followed when utilizing prescribed fire as a management tool. All Forest Wide Standards and Guidelines for Air Quality 1-1 through 1-7 (LRMP, 4:40-41) will be followed to minimize Forest burns affecting air quality in local communities.

The Winema National Forest complies with all applicable air quality laws and regulations, and coordinates with appropriate air quality regulating agencies. Planned ignitions are conducted according to the Operational Guidance for the Oregon Smoke Management Program (OSMP). The Operational Guidance contains the direction for meeting the terms of the OSMP. The Environmental Protection Agency has approved the OSMP as meeting the requirements of the Clean Air Act, as amended. The OSMP, which is administered by the Oregon State Forester, regulates the amount of forestry-related burning that can be done at any one time. The amount of burning that can occur on any one day depends upon the specific type of burning, the tons of material to be burned, and the atmospheric conditions available to promote mixing and transportation of smoke away from sensitive areas. For each activity requiring prescribed fire, the Forest Service requires a written, site-specific prescribed burning plan approved by the Forest Service. The purpose of the plan is to ensure that

resource management objectives are clearly defined and that the site, environment, or human health is not harmed. The plan contains a risk assessment to quantify the chance of fire escaping and develops a contingency plan for actions taken to prevent escape and if it does, quickly contain the escape. The plan will be implemented to minimize the possibility of the burn affecting Class I airsheds or other smoke sensitive areas in accordance with the OSMP.

Smoke sensitive areas near the Ninemile Fuel Reduction Project area include the Class I airsheds of Mountain Lakes Wilderness, Sky Lakes Wilderness, and Crater Lake National Park; the communities of Chiloquin and Sprague River; and the Special Protection Zone around Klamath Falls.

The existing air quality in and near the Ninemile project area is generally good. Degradation of air quality is usually associated with residential wood smoke, backyard burning, summer wildfires, or agricultural field burning.

Smoke is made up of suspended particulate matter and gases. The particulate matter includes PM 10 and PM 2.5. Particulate matter is made up of soot, tars, condensed organic substances, and water droplets. Particulate matter less than 10 microns (PM10) is respirable into human lungs and considered a health hazard. One micron is equal to 1/1,000,000 of a meter. Actual health effects depend on exposure time and concentration of smoke. Data on human exposure to smoke from forestry burning is very limited.

Effects

Alternative 1 No Action

No activity created fuels will be burned, and no underburning will take place. There is no risk of the degradation of air quality from planned actions. No fuel hazard reduction will take place, and no acres will be moved into the low hazard condition. Fuel hazards will remain at current levels and will increase over time. Wildfires will remain the main source of smoke within the Ninemile Area in the future.

Alternative 2 Proposed Action

In the action alternative, activity fuels will be created by several actions. Harvest will produce slash that will be treated by removing the entire tree to the landing for delimiting and topping (Yard Top Attached or YTA). Tops and limbs may be removed from the forest by chipping or may be burned on the landings. Whipfall trees are another source of slash. Slash concentrations will be spot piled, and the piles burned. Underburning of natural fuels will also produce smoke.

Air quality would potentially be affected by prescribed burning (underburning and pile burning) or from wildfire, or dust from equipment use and road use. The principle effect, whether by prescribed fire or wildfire relates to temporary visibility impairments and effects on human health. Emissions from smoke or dust would result in release of pollutants into the atmosphere, possibly affecting the health of forest workers and residents/recreationists in the vicinity of the on-going projects.

Table 3-27 shows the estimated amounts of particulate matter (PM) that will be created by the smoke from the burning prescribed for the action alternative. The acres of burning below are for the treatment of activity fuels and natural fuels. The values in the table are estimates. The actual amount of particulate matter released is dependent on many variables such as actual fuel loading, weather, fuel moisture, firing method, and other factors. Burning will only be conducted when actual and predicted atmospheric conditions will minimize the possibility of smoke affecting the residents near Ninemile and the sensitive airsheds described above.

Table 3-27. Estimated Particulate Emissions from Ninemile Alternative 2

Proposed Fuel Treatment	Number/Acres	Tons PM 10
Burn Landing Piles	175 landings*	498 tons
Burn Machine Piles/Hand Piles	1466 acres	210 tons
Underburn	6374 acres	478 tons
Total		1186 tons
* estimated 1 landing per 20 acres of harvest		

Roads and Transportation System

Current total road density (open and closed roads) within the Ninemile Area is 3.08 miles per square mile. There are approximately 124.1 miles of road within the Ninemile Project Area. Most of the roads within the Ninemile area are either Level-2, high clearance roads (48 percent of the roads) or Level-1, intermittent roads (37 percent of the roads).

The existing transportation system was primarily developed for timber harvest. It has been maintained through timber harvest and capital investment programs. With the reduction in the timber harvest program and funding for capital investment, current road conditions have slowly deteriorated in the project area due to deferred levels of maintenance. There have been no timber sales in the majority of the project area since the Corbell and Friendship Sales in the mid-1980s. The Lone Pine Fire in 1992 resulted in road maintenance in the easternmost portion of the Ninemile.

The consequences of this deferred maintenance include brush encroachment into the roadway and ditchline, ditchline blockages due to slope ravel and brush encroachment, loss of road surfacing, and rutting of the road surface. With lack of adequate funding to maintain all the forest roads, the road system will continue to deteriorate. Needed reconstruction for planned activities would consist of: roadside brushing, ditchline and culvert cleanout, spot-resurfacing the traveled way with crushed aggregate, stabilization of soft spots, and construction of new drainage features to achieve a self-maintaining condition. The desired road management strategy for Maintenance Level 1 and 2 roads would be to move these roads towards a “self-maintaining” condition.

No new permanent road construction is proposed with this project. Area-wide road closures are not part of this analysis, but may be considered in a future road closure project. Temporary roads will be built to the lowest possible standard to facilitate timber harvest should Alternative 2 be selected. Most temporary roads will be located on

existing closed or non-system, user-defined roads. Temporary roads proposed for Alternative 2 are shown in Figure 1-3. All temporary roads will be obliterated following completion of project activities, and will not add to the long term road density.

Effects

Alternative 1 No Action

Under No Action only routine maintenance and repair of existing road facilities would occur. As in the recent past, there would likely be opportunities from time to time to replace or upgrade road/stream crossings and improve road surface drainage as funding allowed. There would be no comprehensive management activities to restore and maintain road systems within Ninemile.

Alternative 2 Proposed Action

The following specific road reconstruction and maintenance will take place as part of the timber harvest proposed in Alternative 2. In addition to these specific needs, minor blading and reshaping maintenance will be done on all roads used for the commercial timber sale portion of the fuel reduction project. The roads may be viewed in Figure 1-3, the Ninemile Project Area Transportation Map.

A segment of Road 5808, from the 5815 Road to the 5808-050 spur, approximately 0.5 miles in length, is not a viable log truck haul route. This segment of road approaches the intersection with the 5815 at a steep grade and has poor site distances with this intersection. The approach to the intersection with the 5815 is also located on a tight horizontal curve with the 5815 and creates a dangerous approach for vehicles in both directions of travel. The unsurfaced roadway has subgrade deterioration from inadequate drainage relief as well as vehicle use during wet conditions. This segment of road cannot be used in the present location as a safe haul route for the removal of timber. An alternate route utilizing existing roads 5815-040 and 5808-050 will be upgraded by reconstruction thereby providing an alternate route that will be safe and efficient as a transportation system for the removal of timber.

Roads 5815-040 and 5808-050 are presently maintenance level-1, short term roads and will require reconstruction for approximately 0.6 and 0.8 miles respectively. The reconstruction will upgrade these roads to a maintenance level-2, long term system road. This upgrade will widen the existing narrow roadway to a consistent 12 foot wide roadway template with turnouts. Reconstruction will include waterbar installation, surfacing, drainage improvement and culvert installation. The portion of the 5808 Road that is being replaced will be obliterated and returned to bed.

Road 5815 will be reconstructed from the 5802 Road to the intersection with the 5808 Road for approximately 0.3 miles. Reconstruction is required on this section of roadway. It has sustained grades from 3 to 9 percent and lacks adequate drainage relief, resulting in surface erosion. Work will include constructing rolling dips, blading, and shaping the existing surfaced travelway. Construction of rolling dips will maintain surface integrity to sustain log truck traffic for the proposed timber sale, and to make the road more usable for the public.

Road 5808-060 will require reconstruction from the 5808 to the 5808-062 spur for approximately 1.4 miles. The reconstruction is comprised of two segments that require specific types of construction work for each segment. Segment 1 starts at Road 5808 and ends at milepost 1.0. Segment 2 continues from milepost 1.0 to road 5808-062 for approximately 0.4 miles of reconstruction.

Segment 1 is generally located adjacent to the Sprague River and is anywhere from 30 to 200 feet from the riverbank. This segment of roadway subgrade consists mainly of sandy silty loam soils which are associated with low soil support values that will not sustain traffic during wet periods and will produce extremely dusty conditions during dry seasons. The existing roadway is less than 12 feet in roadway width and lacks adequate turnouts to safely haul timber or to be used by the public. Hydrologist reports for this area express concerns of increased sediment introduction into the Sprague River from increased traffic volumes on road 5808-060.

The work on Segment 1 will include reconstruction of the roadway subgrade and construction of adequate turnouts to safely accommodate log truck traffic. Considering the loading capacity of log trucks and the questionable bearing strength of the existing roadway subgrade, 6 inches of crushed rock is recommended with possible geotextile reinforcement in potential subgrade soft spots. Placing a layer of crushed rock on the road will also harden the roadway surface and reduce the likelihood of increased sediment introduction into the Sprague River. Drainage improvements on Segment 1 will include a culvert replacement in the vicinity of milepost 1.0 and culvert installations at intermittent stream crossings. All culvert installations will include splash aprons to reduce sediment deposit into the Sprague River. This work will also leave the road in good condition for the public that uses it to access the Sprague River for swimming and other recreational pursuits.

Segment 2 will require construction of several rolling dips to control roadway erosion and disperse runoff from reaching the Sprague River. All rolling dips should be constructed with crushed aggregate to harden the surface and rolling dip leadoffs should be armored with riprap to reduce erosion.

All road reconstruction activities associated with the Ninemile Project will follow Best Management Practices (BMPs) to ensure limited resource damage. The BMPs may be found in Appendix B.

Economic Analysis

This analysis addresses both the efficiency of the project and its impact upon the local economy.

Efficiency

Alternative 1, the No Action alternative, would be implemented simply by halting the project development process. This would generate no management costs or returns. The Present Net Value would be zero.

In contrast, Alternative 2, the Proposed Action, implements a variety of actions to

reduce fuel levels in the area. Some of the fuels to be removed have commercial value and can be sold to generate financial returns. Many of the fuels reduction activities are expensive and generate no returns.

A third alternative, no commercial harvest, was considered and rejected. From an economic perspective, this alternative would have cost more than Alternative 2 to achieve the same level of fuels reduction simply because none of the fuels being removed would be sold. Thus all of the costs, and more, from Alternative 2 would be involved, but there would be no returns to contribute to the PNV.

Details about this analysis are displayed in the Economic Analysis Report in the project record. Key economic efficiency parameters are displayed in the following table at both a 4% and 10% discount rate:

Table 3-28. Ninemile Economic Efficiency at Two Discout Rates

Evaluation Parameter	4% Discount Rate		10% Discount Rate	
	Alternative 1	Alternative 2	Alternative 1	Alternative 2
Present Value Cost (PVC)	0	-\$2,194,000	0	-\$2,828,000
Present Value Returns (PVR)	0	+\$1,143,000	0	+\$1,143,000
Present Net Value (PNV)	0	-\$1,771,000	0	-\$1,685,000

Because this analysis used net forest product values and they were positive, all of the costs displayed above are from non-commercial activities like slash busting, piling and burning. The two discount rates are used to test the sensitivity of the analysis to discount rate. With the major differences between the alternatives, the discount rate has no effect on the comparison of alternatives. Note that the present value of returns is the same regardless of discount rate because all of the returns are generated in the first year of activity.

The results of the Present Net Value analysis displayed here clearly show that it is not a good financial investment decision for the Forest Service to implement the proposed action because the project costs more than it returns. However, there are many other factors that contribute to the Net Public Benefit of a project.

Net Public Benefit can be visualized as the sum of the Present Net Value and Net Subjective Values. While Present Net Value takes into account the key financial aspects of the project from the Forest Service’s point of view, implementing the project will produce an array of non-monetary effects that can be characterized as detrimental or beneficial and quantified in a variety of ways. These effects, like effects upon mule deer, the level of fire hazard reduction and effects upon old growth forest structure are considered subjectively, based upon information provided in the Environmental Assessment. The question for the decision maker is whether or not the non-monetary benefits of this project outweigh the non-monetary and monetary costs of the project.

Economic Impact

In addition to the efficiency aspects of the project that get at the project's investment potential, the alternatives have differing effects upon the local economy. Those effects are displayed as jobs supported by the project activities and include both jobs associated with removal of commercial products and jobs associated with other activities. The support of jobs affects the local economy in different ways, often characterized as follows:

Direct impacts are those that are directly related to the activity in question. For timber harvest this would involve the jobs and income associated with logging and milling. Mill workers, naturally, work in mills so the economic impacts of those jobs appear where the mills are located. The logging operations occur in the forest thus the economic impacts occur both in the vicinity of the job, in this case supporting the economy in the Chiloquin-Sprague River areas, and in the places where these workers live.

Indirect impacts are those that are closely related to the item that generates the direct impact, but don't deal with initial processing. This may include jobs in lumber haul (which deals with lumber rather than logs), jobs associated with purchases made by the mill to keep it operating and so on.

Induced impacts are those that are one step farther removed. These jobs are associated with expenditures made by the people that benefit from the direct and indirect activities. These would include jobs in services (grocery stores, gas stations, phone, electricity etc), retail and wholesale trade and anything manufactured or processed that these people might buy.

For the purposes of this analysis we will display estimates of total jobs. They include all of the jobs supported through direct, indirect and induced economic activity. Details of this analysis are included in the project record. Table 3-29 displays the estimated total jobs associated with the commercial and non-commercial project activities.

Table 3-29. Estimated Job Creation by Alternative for Ninemile

Activity Job Source	Alternative 1 No Action	Alternative 2 Proposed Action
Commercial	0	172
Non-Commercial	0	183
TOTAL	0	355

Commercial activities include the removal of sawtimber and fiber. Non-commercial activities include all of the other types of fuels treatments. These jobs are associated with expenditures made during the periods the activities take place. For example, the \$1.3 million being spent on slashbusting and mowing during years 1 through 3 would support jobs in that time period.

The number of jobs associated with the alternatives is considered one of the components of Net Subjective Value and are weighted against all the other project

effects to determine the alternative with the highest Net Public Benefit.

The effects of the activities upon the economy depend upon where the work takes place as well as where the workers come from. For commercial activities, some work, such as logging, takes place at the project location, while other work, like milling and processing takes place elsewhere. The analyses summarized in the project record reveal a mean of 3.93 jobs per million board feet are related to logging. Of the 172 total jobs associated with the commercial activities in Alternative 2, about 56 (14.3 mmbf X 3.93 jobs/mmbf) would be associated with woods work. The remainder of the direct jobs would be located in mills and processing facilities while the indirect and induced jobs are supported both locally, in the vicinity of the project, in the vicinity of the mills and to a lesser degree across the state.

All of the non-commercial work is performed in the woods. Thus more of these workers would be spending money in the local area and inducing further economic activity there. At the same time, many of these workers will come from outside the area and will be spending a portion of their income from these jobs in their home areas.

Alternative 2 will thus have a beneficial effect upon the economy in the Chiloquin and Sprague River areas as well as areas such as Klamath Falls and Gilchrist where mills are located. Due to the relatively short duration of the project and its seasonal nature, it is not likely to have measurable effects upon the local economy beyond the period of operations.

There is some potential for cumulative effects on the local economy because there will be similar work taking place in the Toolbox Fire Recovery area in the vicinity of Silver Lake. Because of the direct work going on in these areas the indirect and induced economic impacts will be enhanced for businesses that serve both areas. To the extent the Forest Service can sustain a continuous program of this type work, the local economies would be benefited over a longer time frame.