United States Department of Agriculture
Forest Service
Prairie City Ranger District
327 Front Street
P.O. Box 337
Prairie City, OR 97869
(541) 820-3311
FAX (541) 820-3838

File Code: 1950

Date: September 29, 2006

Dear Forest User:

I am pleased to report that the Prairie City Ranger District, Malheur National Forest has issued an Environmental Assessment (EA), Decision Notice, and Finding of No Significant Impact (FONSI) for the 16 Road Forest Health Project. I have enclosed a copy of the Decision Notice and Finding of No Significant Impact.

The 16 Road Forest Health Project area is a forested, public travel corridor identified in the Grant County Community Fire Protection Plan as containing a fire-evacuation route from an "at-risk community." The 16 Road Project Area is located approximately 37 road miles from the cities of John Day/Canyon City and 26 miles from Prairie City. The Federal Register identifies all three cities as at risk to urban interface fires. Between these Cities and the 16 Road Project are many homes with outbuildings, ranches, and cabins. Many of these dwellings are directly adjacent or intermingled with National Forest lands. The highest concentrations of homes interfacing with the National Forest are located along Highway 395 (South of John Day/Canyon City), County Road 65 (along Canyon Creek – South of John Day/Canyon City), and County Road 62 (South of Prairie City). In event of a wildfire the 16 Road could serve as the evacuation route for the residents of homes. The 16 Road may also serve as an alternate transportation route in event of a wildfire in the Highway 26 or Highway 395 corridors. In close proximity to the 16 Road Project are two Forest Service Guard Stations and private lands containing structures. The Crane Prairie Guard Station is located adjacent to the project area.

Using the comments you provided during collaboration and scoping we made refinements to the proposed action (the selected alternative) and added particular design features, conservation measures, or monitoring requirements. I feel that the selected alternative, balances the objectives for the project and your comments. We may not have fully met all your concerns, but your comments were considered and addressed in a balanced manner.

The selected alternative include both noncommercial and commercial thinning using low-thinning methods, which remove mainly lower- or mid-level trees to favor and redistribute growth potential to upper-level large trees. Trees to be removed would be those currently contributing to crown-fire potential or bark-beetle risk, up to a size limit of 21 inches in diameter at breast height (DBH). A combination of fuel treatments including whole tree removal, lop and scattering, piling by ground based machines, hand-piling and burning, and underburning will be used in combination with thinning.

All activities are planned under the authority of the Healthy Forest Restoration Act of 2003 (HFRA).

This decision is not subject to appeal pursuant to 36 CFR 215.12 (Decisions and actions not subject to appeal) and implementation may begin immediately. The objection process pursuant to 36 CFR 218 provided the sole means of administrative review for this HFRA project. This objection process has been completed. The environmental assessment was previously mailed out for the 30-day objection period on June 7, 2006. An advertisement announcing the availability of the environmental assessment and the objection period was placed in the Blue Mountain Eagle, a John Day newspaper, on June 7, 2006. Two objections were received and considered. The reviewing Officer (Stan L. Benes) responded to both objections in writing.

For further information, or to request a hard copy of the EA, contact Ryan Falk at the Prairie City Ranger District, 327 Front St., Prairie City, OR 97869, (541) 820-3800. The FAX number for the Prairie City Ranger District – Malheur National Forest is (541) 820-3838. The EA and Decision Notice/FONSI, is available on the following Malheur National Forest web site:

http://www.fs.fed.us/r6/malheur/projects/index.shtml

Sincerely,

STEVE COSSETTE
Acting District Ranger

Enclosures

cc: Carole Holly, Ryan K Falk, Steve Cossette

Decision Notice

and

Finding of No Significant Impact

16 Road Forest Health Project

Environmental Assessment

September, 2006

Malheur National Forest

Prairie City Ranger District

Grant County, Oregon

The United States Forest Service, Malheur National Forest proposes to reduce fire hazard through the use of fuel burning, noncommercial and commercial thinning, and machine work for fuel disposal or removal in the 2,445 acre 16 Road Forest Health Project Area on the Prairie City Ranger District. All activities are planned under the authority of the Healthy Forest Restoration Act of 2003 (HFRA). The project area is a forested, public travel corridor identified in the Grant County Community Fire Protection Plan as containing a fire-evacuation route from an "at-risk community." The 16 Road Project Area is located approximately 37 road miles from the cities of John Day/Canyon City and 26 miles from Prairie City. The Federal Register identifies all three cities as at risk to urban interface fires. Between these Cities and the 16 Road Project are many homes with outbuildings, ranches, and cabins. Many of these dwellings are directly adjacent or intermingled with National Forest lands. The highest concentrations of homes interfacing with the National Forest are located along Highway 395 (South of John Day/Canyon City), County Road 65 (along Canyon Creek – South of John Day/Canyon City), and County Road 62 (South of Prairie City). In event of a wildfire the 16 Road could serve as the evacuation route for the residents of homes. The 16 Road may also serve as an alternate transportation route in event of a wildfire in the Highway 26 or Highway 395 corridors. In close proximity to the 16 Road Project are two Forest Service Guard Stations and private lands containing structures. The Crane Prairie Guard Station is located adjacent to the project area.

In relation to the historic role of fire, the entire project area is classified as one in which surface fires, as opposed to crown fires, were most common. Such fires were of low to mixed severity, resulting in much fuel consumption yet survival of a substantial portion of the upper-level large trees. By contrast, the prevailing, current fuel condition (87 percent of the area) is highly departed from these historic characteristics, meaning there is considerable fuel on the ground and the forest is relatively dense at one or more vertical levels. Overall, these conditions create a risk for uncharacteristically intense fire behavior should a fire occur, and a related risk for severe fire effects on both natural resources and man-made improvements. The current conditions also pose a generally high near-term risk that timber stands of the area will experience bark-beetle outbreaks, especially during droughty periods. Bark beetles are currently present at endemic population levels, killing scattered individual or small pockets of trees, and are expected to increase unless stand densities are generally reduced. More dead or dying trees from bark-beetle attacks would add to the current fuel hazard and its potential fire impacts.

Proposed activities will reduce the risk of loss to the evacuation route, private property, and public facilities and resources in or near the project area, by creating forest conditions that would moderate potential wildfire intensity and allow firefighters a good chance of controlling fires in this area. Additionally, activities will reduce the risk of uncharacteristically intense fire behavior resulting from fuel accumulations of future bark beetle caused mortality. A majority of the proposed fuel reduction activities will be done through contracts, providing employment opportunities to the local community.

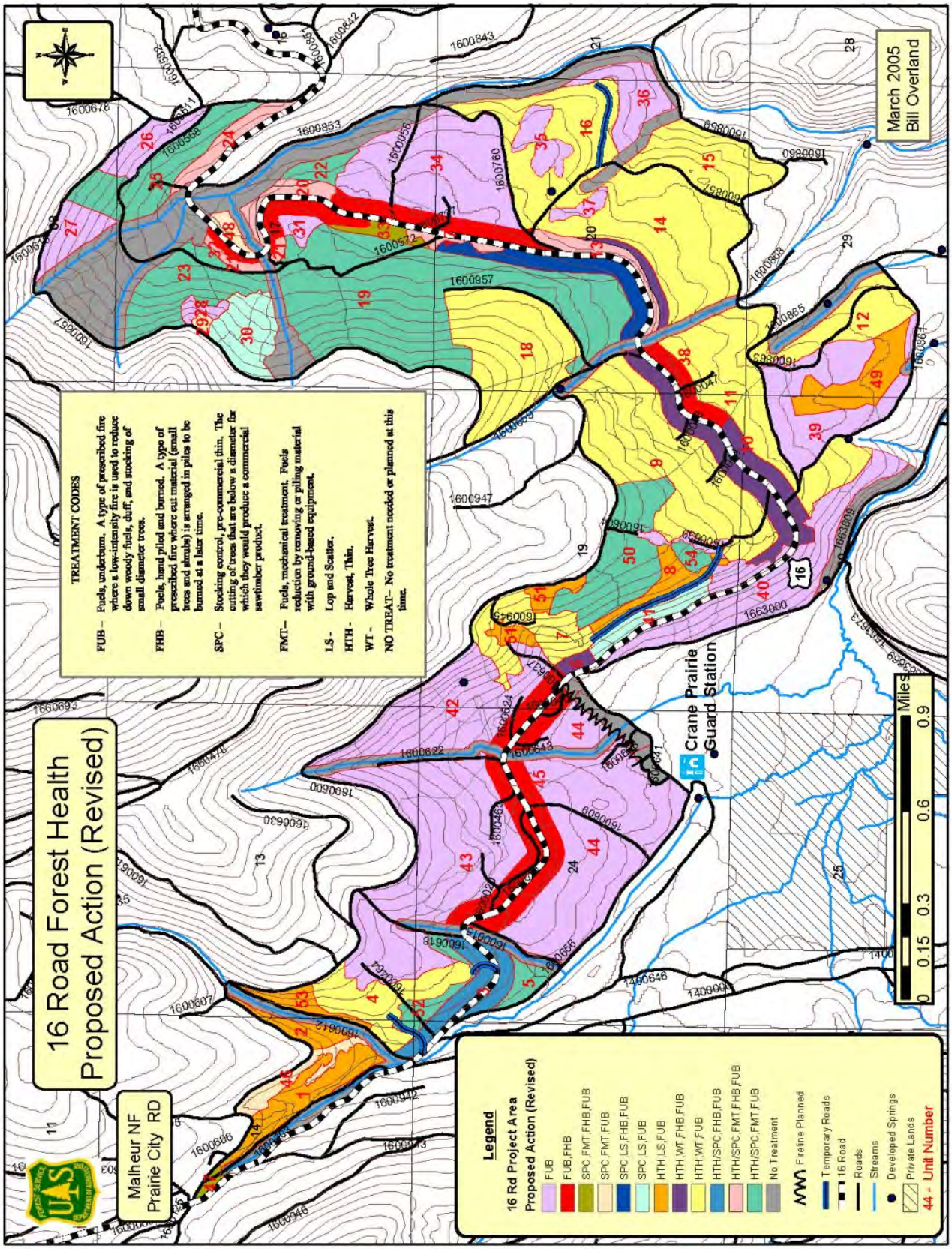
The Decision

Based on the analysis described in the Environmental Assessment, collaboration with the partners to the Grant County Community Fire Protection Plan, Grant County Court and Resource Advisory Committee, Tribes, interested parties, and comments received from the public during this analysis, it is my decision to implement Alternative 2 - Proposed Action (Revised). Alternative 2 will reduce the fuel hazard with a combination several treatment methods on a total of 2,151 acres in the 16 Road Forest Heath Project Area.

Treatments will include both noncommercial and commercial thinning using low-thinning methods, which remove mainly lower- or mid-level trees to favor and redistribute growth potential to upper-level large trees. Trees to be removed would be those currently contributing to crown-fire potential or bark-beetle risk, up to a size limit of 21 inches in diameter at breast height (DBH). A combination of fuel treatments including whole tree removal, lop and scattering, piling by ground based machines, hand-piling and burning, and underburning will be used in combination with thinning. The following table map shows treatment acreages and locations.

Proposed treatments—16 Road Forest Health Project

Proposed Treatments	Treatment Codes (On map)	Est. Acres
Underburning at low or moderate intensity	FUB	705
Underburning at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small fire-killed trees where needed for scenery benefits	FUB, FHB	128
Noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	SPC, FMT, FUB, FHB	10
Noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity	SPC, FMT, FUB	20
Noncommercial thinning; slash lopped & scattered; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	SPC, LS, FUB, FHB	27
Noncommercial thinning; slash lopped & scattered; later underburned at low or moderate intensity	SPC, LS, FUB	43
Commercial thinning; slash lopped & scattered; later underburned at low or moderate intensity	HTH, LS, FUB	105
Commercial thinning with whole-tree removal; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	HTH, WT, FUB, FHB	61
Commercial thinning with whole-tree removal; later underburned at low or moderate intensity	HTH, WT, FUB	606
Commercial & noncommercial thinning; fuels hand-piled & burned; later underburned at low or moderate intensity	HTH/SPC, FHB, FUB	30
Commercial & noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	HTH/SPC, FMT, FUB, FHB	55
Commercial & noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity	HTH/SPC, FMT, FUB	361
All Proposed Treatments		**2,151**


16 Road Forest Health
Proposed Action (Revised)
Malheur NF
Prairie City RD
March 2005
Bill Overland
Crane Prairie
Guard Station
Miles
0 0.15 0.3 0.6 0.9
TREATMENT CODES
FUB – Fuels, understory. A type of prescribed fire where a low-intensity fire is used to reduce down woody fuels, duff, and stocking of small diameter trees.
FHB – Fuels, hand piled and burned. A type of prescribed fire where cut material (small trees and shrubs) is arranged in piles to be burned at a later time.
SPC – Stocking control, pre-commercial thin. The cutting of trees that are below a diameter for which they would produce a commercial sawtimber product.
FMT – Fuels, mechanical treatment. Fuels reduction by removing or piling material with ground-based equipment.
LS - Log and Scatter.
HTH - Harvest, Thin.
WT - Whole Tree Harvest.
NO TREAT – No treatment needed or planned at this time.
Legend
16 Rd Project Area
Proposed Action (Revised)
FUB
FUB,FHB
SPC,FMT,FHB,FUB
SPC,FMT,FUB
SPC,LS,FHB,FUB
SPC,LS,FUB
HTH,LS,FUB
HTH,WT,FHB,FUB
HTH,WT,FUB
HTH/SPC,FHB,FUB
HTH/SPC,FMT,FHB,FUB
HTH/SPC,FMT,FUB
No Treatment
Fireline Planned
Temporary Roads
16 Road
Roads
Streams
Developed Springs
Private Lands
44 - Unit Number

Rationale for the Decision

I have selected Alternative 2 (Revised) because it best responds to specific fire-risk concerns identified by partners to the Grant County Community Fire Protection Plan. The project was reviewed and recommended as a priority by the Grant County Court and Resource Advisory Committee. The project meets the purpose and need for action while meeting all direction provide in the Malheur Land and Management Plan of 1990 (LRMP) and the intent of the Healthy Forest Restoration Act (HFRA).

I have reviewed public comments and issues for this project and have determined that Alternative 2 best addresses them. Following public review of the original proposed action, the interdisciplinary team made refinements to the proposed action and added particular design features, conservation measures, and monitoring requirements in response to public comments. The result of these refinements was a revised proposed action, Alternative 2, which I am selecting for implementation. Summaries describing how public comments were addressed and used to refine the proposed action can be found in the 16 Road Forest Health EA.

I selected Alternative 2 because it will reduce the area of potential crown fire by modifying the surface and canopy fuels along the 16 Road. This will result in improved firefighting capability. Firefighters should be able to direct-attack a fire from Forest Road 16 and more likely stop it at the road. There would be much less chance of a fire crossing the road through the crowns of upper-level trees, correspondingly public evacuation through the area is more likely to be safer. Several similar treatments have been completed on areas on the Prairie City and the Malheur National Forest. One example, the Awake Project, included combinations of commercial thinning, pre-commercial thinning and underburning completed in 2000. In 2002, the Monument Fire moved from untreated areas into the Awake Project area. The treated areas were used as a location to contain the fire spread using tactics such as back-burning and direct fire line. Firefighters were successful containing the fire in these treated areas due to lower fire intensity than that experienced in the un-treated areas. Primarily the lack of crown fire in the treated areas reduced spotting and thus fire spread. From visual inspections, mortality in the forest vegetation in the treated areas was generally much less due to less scorch height on the larger trees and reduced duff from previous underburning.

The density of many timbered stands would be immediately reduced, allowing retained trees to become more vigorous and making the microclimate surrounding them less favorable for beetle population buildups. As a result, serious beetle outbreaks in these areas would become far less probable reducing the risk of uncharacteristically intense fire behavior resulting from fuel accumulations caused by bark beetle caused mortality.

Project- area lands contain habitat of a threatened species (bull trout). Implementation of Alternative 2 would reduce the threat of severe fire effects to bull trout habitat. Treatments would appreciably reduce potential fire intensity, resistance to control, and the risk of severe impacts to forest vegetation, soil, and water. Consequently, the risk of secondary fire impacts to bull trout would be reduced. In event of a large fire event, indirect or secondary short-term impacts to bull trout in Crane and Little Crane Creeks could include increased sediment transport to streams, sediment effects on channel qualities and spawning habitat, ashflow, loss of streamside shade in turn causing higher summer water temperatures, and decreased large woody debris. Crane Creek and Little Crane Creek provide the highest quality bull trout spawning habitat in the North Fork Malheur drainage.

Other Alternatives Considered

Alternative 1 (No Action): This alternative would leave the area in its existing condition. Alternative 1 was not selected because it did nothing to reduce the fire hazard along the 16 Road.

Public Involvement and Collaboration

This project was identified as a priority through local collaborative processes. The project responds to specific fire-risk concerns identified by partners to the Grant County Community Fire Protection Plan. The project was reviewed and recommended as a priority by the Grant County Court and Resource Advisory Committee.

A collaborative planning meeting was held in John Day, Oregon on Sept. 23, 2004 for all interested parties, at which participants provided relevant information, ideas, and concerns that helped shape the proposal. At the collaborative planning meeting, participants asked the Forest Service whether a project at 16 Road that only addressed hazardous fuel reduction, and which relied heavily on noncommercial thinning and underburning and only limited commercial thinning, would meet all fuels reduction needs of the area. Participants asked whether there were additional methods that should be considered, that might yield more raw forest products needed in the local area economy. Forest Service specialists familiar with the area informed the group that the area contained many timber stands with average tree sizes and densities considered to be risk factors for damaging bark-beetle activity, and that bark beetles were present at endemic levels—that is, common but not epidemic, currently killing scattered, individual trees or small pockets of trees. The Forest Service personnel also explained that tree mortality from bark beetles would likely increase in the near term unless stand densities were reduced. This bark beetle mortality would add to fuel loads, increasing fire intensity and resistance to control. Subsequent oral and written comments from participants encouraged the Forest Service to address all current resource-management needs of the area consistent with Forest Plan direction, and to use treatments or methods that would support commercial activity in conjunction with treating fuel hazards. This collaborative advice was closely considered by the Forest Service and ultimately led to expanding the scope of the 16 Road Project to include reducing the risk of loss to timber and other forest values from bark-beetle activity. This objective was added both to make the proposal more responsive to all applicable management direction of the Forest Plan and to keep the current fuel problem from becoming worse, or recurring, as a result of beetle-killed trees. In addition to encouraging the Forest Service to enlarge the scope of the project as described above, participants also contributed information and ideas that helped define actual proposed treatments adjacent to Forest Road 16. All of the above-described collaborative work was performed at the project development stage, to help formulate the proposed action—that is, prior to external “scoping” (review and comment) of a proposed action.

On February 17, 2005, the project proposal and invitation to comment as part of the scoping process was issued and mailed to approximately 220 interested individuals, organizations, state and federal agencies, and tribal offices.

Issues identified during scoping are normally addressed by developing alternatives to the proposed action; however, no alternatives are required for this HFRA project. Instead, the interdisciplinary team considered all the comments received during collaboration and scoping and made refinements to the proposed action and added particular design features, conservation measures, or monitoring requirements. These were based on both additional internal review and consideration of relevant external comments (EA Appendix A, pages 111-118) summarizes individual external comments and

explains their relationship to some of the changes. The refinements and additions were made to clarify or ensure that the proposed action would serve the stated purpose and forest-management needs in a manner consistent with applicable standards, or to avoid or reduce potential adverse effects to certain environmental values. The revised proposed action reflects the following refinements or added features:

- Some treatment proposals involving commercial or noncommercial thinning were modified in order to maintain canopy-cover requirements in medium-density stands to provide goshawk nesting habitat and post-fledgling areas (PFAs), late and old structure (LOS) candidate stands and connection corridors, and pileated woodpecker habitat.
- Detailed logging-feasibility and resource-protection considerations resulted in some previously proposed commercial thinning treatments being limited to noncommercial thinning or underburning only.
- An additional archeological site requiring protection was identified and proposed treatments were deferred in this area.
- Winter logging was adopted as a basic requirement for all proposed commercial thinning.
- Commercial and noncommercial thinning treatments proposed in visual-corridor foreground areas along Forest Road 16 maintain variable spacing for retention trees to avoid unnatural-looking vegetation patterns.
- Additional big game hiding cover would be provided by retaining untreated patches of forest trees throughout the project area, with emphasis on relatively flat topography and around existing snags for their further protection
- On slopes facing Forest Road 16, slash-burn piles will be placed up to 50 feet away from the road where practicable, to reduce visual impacts.
- During winter operations, an alternate snowmobile route(s) would be designated to substitute for the short-term loss of snowmobile routes used for winter log haul.

The environmental assessment was mailed out for the 30-day objection period on June 7, 2006. An advertisement announcing the availability of the environmental assessment and the objection period was placed in the Blue Mountain Eagle, a John Day newspaper, on June 7, 2006.

Objections were received by Asante Riverwind, Oregon Chapter Sierra Club (OCSC) and Doug Heiken, Oregon Natural Resources Council (ONRC). The objection filed by Asante Riverwind failed to meet the objection requirements of the Healthy Forest Restoration Action (36 CFR 218.6 (a)) and therefore was dismissed. The reviewing Officer (Stan L. Benes) responded to Oregon Natural Resources Council on August 4, 2006 stating that he was instructing District Ranger Brooks Smith not to proceed with issuance of a Decision Notice for this project until the issues identified in three specific objections statements were addressed. To address these issues the Environmental Assessment (EA) was edited to include the following:

- The environmental analysis was edited to expand discussions of snowmobile routes, including alternative routes with potential impacts. The EA now clarifies that alternative routes will be limited to existing approved snowmobile routes that are part of the Forest trail system.
- ONRC comments provided during scoping were further addressed. Comments area addressed in the following sections of the EA:
    - EA Part 2, Proposed Action (Revised), pages 10-15
    - EA Part 2, Issues, pages 16-19

  - EA Part 2, Alternatives Considered and Eliminated From Detailed Study, pages 19-20
  - EA Appendix A, Summary of External Comments on the Proposal, pages 111-118
- The EA was augmented to disclose implementation monitoring of design measures that would affect snags and coarse woody debris during project accomplishment.

The OCSC and ONRC objections, and the response to the ONRC objection may be found in the project record.

Finding of No Significant Impact

Based on the site specific analysis summarized in the 16 Road Forest Health Project EA and this Decision Notice, and on previous experience with similar proposals, I have determined that this action is not a major federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement will not be prepared. The determination was made considering the following factors:

1. *Impacts that may be both beneficial and adverse*. Both beneficial and adverse impacts (40 CFR 1508.27 (b)(1)) of implementing the Selected Alternative have been fully considered within the EA. Beneficial and adverse direct, indirect, and cumulative environmental impacts discussed in the EA have been disclosed within the appropriate context and intensity. I find that my decision would have neither a significant beneficial or adverse impact because the acres treated are a small percentage of similar acres across the landscape, and the anticipated effects are similar to those in past fuel reduction projects, which have not proven to cause significant impacts. I based this finding on the following summary of expected impacts to forest fire hazards, air quality, fisheries, soils, forest vegetation and wildlife.

Resource	Impacts	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Forest Fire Hazards	Potential wildfire average flame-length. Ability to effectively take action to suppress a wildfire Safe public evacuation route	2,151 acres of proposed underburning, commercial thinning, pre-commercial thinning,	Selected alternative appreciably reduces potential fire intensity across the project area. Surface fuel loads would be closer to historic conditions after treatment. Compared to non action flame-length under "97th percentile" fire weather conditions increases from 6.0 to 7.3 feet, due to change to lighter fuels) more grass, less woody debris) and increased effective wind speed from lower stand densities. Fires occurring during extreme weather conditions would be primarily surface fires, as opposed to crown fires. Direct attack by ground-based crews and equipment would be more effective with general fire severity much lower. Public evacuation through the project area is likely to be safe under any given set of fire-weather conditions (EA, pgs. 34-35).

Air Quality	Air quality in areas downwind of project area (Monument Rock Wilderness, and town of Unity)	2,151 acres of proposed underburning	All burning would occur outside visibility-protection periods set for Central Oregon of July 1st to September 15. In compliance with the Clean Air Act, burning of any kind will not occur unless approval is granted by Oregon Department of Forestry. Appreciable adverse effects are not likely from burning under planned and approved conditions, as smoke would be diluted. If burning can be conducted under west or northwest winds, air-quality impacts on communities would essentially be avoided. Burning activities will be scheduled in relation to weather factors and other planned burning in the area, to comply with the Clean Air Act (EA, pg. 41).
Fisheries	Stream or streamside habitat-quality factors (stream sediment, large woody debris, temperature and shade, water yield, wet or flooded areas and closely connected riparian habitat) Threatened and R6 sensitive species or habitats, including Malheur management indicator species (threatened bull trout), interior redband trout, and Columbia spotted frog (R6 sensitive)	No Commercial harvest would occur in RHCAs. Prescribed fire may be allowed to creep at low intensity into RHCAs	The selected alternative is unlikely to cause direct adverse effects to bull trout or redband trout, and at most only minor (indeterminable) indirect or cumulative adverse effects to their habitat (EA, pg. 84). The winter harvest requirement, RHCA buffers, and related restrictions will minimize soil surface disturbance and protect streams from receiving any appreciable, added sediment from logging, limited road work, or related activities. Prescribed burning that may be allowed to back into RHCAs. Temporary and minor increases in sediment reaching streams from limited burning in RHCAs is possible, but unlikely to cause any measurable change to current trout habitat (EA, pg. 84).
Soil	Soil conditions for forest tree and plant production. Soil conditions including compaction, displacement, erosion, or excessive heating.	Commercial timber harvest on 1,218 acres. Grapple piling with mechanized equipment. Prescribed burning on 2,151acres.	Soil compaction is avoided or controlled in most areas by incorporating design features and conservation measures that include requiring sufficient snow cover to avoid substantial disturbance of soil, skid trail planning and approval requirements, and heavy equipment restrictions. At log landings additional compaction would occur as well as some soil heating from burning "top piles" that would be created by whole-tree logging. This could lead to a 2 to 3 percent increase in detrimental soil disturbance in certain treatment units. Adverse effects of compaction and burning tops piles would be reduced after harvest activities are completed by "subsoiling" landings (using equipment to loosen compacted soil) and then seeding each landing with certified noxious-weed-free native seed mix. Low-to-moderate intensity underburning (surface fire) will have no appreciable adverse effects on soil properties or water quality. At present soil disturbance in the project area as

			a whole is less than 11 percent total. The predicted increase from harvest and fuel treatment activities would still result in considerably less than a total of 20 percent "detrimental conditions," or well within the applicable Forest Plan standard (EA, pg. 46).
Forest Vegetation	Presence of large trees. Variety of tree size-classes and cover conditions. Bark beetle risk	Commercial timber harvest on 1,218 acres.	Proposed action causes an immediate change to higher level of large trees, as many smaller, lower-level trees are removed with treatments. A variety of stand structures would still be present, but would change toward larger-diameter, upper-level trees, because treatments would focus on removing lower level trees. Growth of large trees would be accelerated and treated stands would advance more quickly toward late or old stand structure conditions. The density of many stands currently at risk of bark-beetle activity would be immediately reduced toward the recommended lower management zone. Serious bark beetle outbreaks in these areas would become fare less likely (EA, pg. 55).
Wildlife	Maintain adequate big game hiding and escape cover. Snag habitat for primary cavity excavator species.		Forest Plan Standards for big game summer range would continue to be met after implementation of the Selected Alternative. Currently, total cover is 37%, exceeding the Forest Plan standard of 20%. Satisfactory cover is at 7%, less than the Forest Plan standard of 12%. Marginal cover is at 30%, exceeding the Forest Plan standard of 5%. With proposed treatments total big game cover would be reduced to 34% (3 percent decrease), which is still above Forest Plan standards. Satisfactory cover would remain at 7 percent (no change). Within areas treated, hiding cover for big game would also be provided by retaining untreated patches of forest trees throughout the project area. In the short-term big game distribution may change, but deer and elk populations would be expected to remain the same (EA, pg. 65). At the subwatershed level, the loss of snags from harvest would be expected to be minor due to the small area affected and the fact that snags would not be targeted for removal. Snags felled for safety during logging operations would impact 5%-10% of the existing snags in the treatment units, and less than 1% at the subwatershed level. The number of smaller snags (< 10" dbh) would increase as a result of applying prescribed fire treatments while the level of large snags would remain relatively unchanged. Although the analysis area is currently below Forest Plan standards, this additional level of impact would not be expected to adversely affect PCE populations in the analysis area. At the

			subwatershed scale, the levels of snags greater than 20" dbh would be expected to be similar to historic snag levels (EA,pg. 69).
	Management indicator species (MIS) habitat.		Long term-habitat diversity would be provided by increasing the proportion of early seral species (ponderosa pine, western larch, and quaking aspen) and reducing the proportion of forest stands currently trending toward dominated grand fir. In the short-term, wildlife species that hide in or feed on grasses, forbs, and berries would benefit as more ground cover vegetation develops in response to treatment; but species that currently use higher-level thickets for hiding, nesting, and roosting would have less of this habitat available. Untreated patches of trees across the landscape would be retained for vegetation diversity. The Forest Plan identifies three MIS species for old growth, primarily Old Forest Multi-Strata (OFMS) structured stands: pileated woodpecker, pine marten and three-toed woodpecker. In addition the white-headed woodpecker is a good indicator of the health of Old Forest Single Stratum (OFSS). The selected alternative would have little effect on existing late and old structure (LOS). Treated stand would likely be managed in the future towards OFSS, currently the most limited forest habitat, providing old growth conditions more supportive of species that require lower canopy cover such as white-headed woodpecker and flammulated owl. Under the selected alternative there would be a slight reduction in habitat for pileated woodpecker and pine marten. No activities would occur in primary habitat for pileated woodpecker and pine marten in the project area. At the larger subwatershed scale, primary and secondary habitat would remain plentiful; stand growth projections indicate habitat would increase in the mid-to long-term (EA, pg. 63).
	Threatened and endangered species habitat.		Threatened Northern Bald Eagle and endangered Gray Wolf would not be affected; and sensitive species California Wolverine, Pygmy Rabbit, Pacific Fisher, American Peregrine Falcon, Western Sage Grouse, Gray Flycatcher, Bobolink, Upland Sandpiper, Tricolored Blackbird, and Bufflehead would not be impacted. A finding of May Effect, Not Likely to adversely Affect (NLAA) was made for threatened Canada Lynx. Three stands are proposed for treatment within the boundary of the Glacier Lynx Analysis Unit (LAU). The units are deemed non-habitat for lynx because of the grand fir plant associations, and would not result in further modification to the Glacier LAU. Informal

			consultation on Canada lynx was initiated in April, 2005 with U.S. Fish and Wildlife Service (USFWS). Concurrence on the project was completed on September 26, 2006 using the Counterpart Regulations authorized under the Healthy Forest Restoration Act (EA, pgs. 66-68).

2. *The degree to which the action affects public health and safety*. Smoke management guidelines will be followed (EA, page 41-42). The Selected Alternative would not significantly affect public health or safety (40 CFR 1508.27(b)(2)). The treatments will lead to a beneficial effect upon public health and safety because it has the potential to reduce the intensity of wildfires. Public evacuation through the project area is likely to be safer under any given set of fire-weather conditions (EA, pgs. 34-35).

3. *Unique characteristics of the geographic area (40 CFR 1508.27(b)(3)).* My decision will not affect any unique areas such as parklands, prime farmlands, wetlands, wild and scenic rivers, potentially eligible wild or scenic rivers or ecologically critical areas, as there are no such areas in the project area.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial (40 CFR 1508.27 (b)(4)). My decision falls within the scope of the analysis for the Malheur Land and Resource Management Plan (1990), as amended, and it's supporting Environmental Impact Statement. The desired future condition, standards and guidelines and the analysis for the Forest Plan support fuel reduction and related activities like those in this action for this area. My decision includes no activities that were not addressed in the Forest planning process. These types of activities have taken place on the Prairie City Ranger District in similar areas and the resulting effects are well known. There is no known scientific controversy over the impacts of the project. CEQ guidelines on controversy refer not to the amount of public opposition, but to a substantial dispute as to the size, nature, or effect of the action.

5. *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks (40 CFR 1508.27(b)(5)).* My decision does not involve highly uncertain, unique, or unknown risks. The activities proposed in this decision are well established land management practices, and the risks are well known and understood. Based on previous similar actions the probable effects of this decision on the human environment, as described in the Environmental Assessment, do not involve effects that are highly uncertain or involve unique or unknown risks.

6. *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principal about a future consideration.* My decision will not establish a precedent for future action with significant effects because this action is not unusual in itself and does not lead to any further action that is unique (40 CFR 1508.27(b)(6)).

7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27 (B)(7)).* The Selected Alternative is not related to other actions with individually insignificant but cumulative significant impacts. The analysis of the past actions follows the Council on Environmental Quality guidance provided on June 24, 2005. Appendix C in the EA displays all activities and natural events that already have occurred, are currently occurring, or are likely to occur in the area of potential cumulative effects. The information in Appendix C is then incorporated into cumulative effects discussions in the environmental consequences section in Part 3 of the EA.

8. *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources (40 CFR 1508.27 (b)(8).* My action will not adversely affect any scientific, cultural, or historical resources. A heritage resource field survey has been completed for the analysis area. Under the auspices of a "Programmatic Agreement, 2004" with the State Historic Preservation Office, the Forest Archeologist has certified that the project will have "No Effect" on historic properties as defined by 36 CFR 800.16(i).

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat.* Actions are not likely to significantly adversely affect any endangered, threatened, or sensitive terrestrial wildlife species, aquatic species, plant species, or designated critical habitat (40 CFR 1508.27 (b)(9). Biological evaluations were completed for threatened, endangered, and sensitive species of animals, fish, and plants.

Sensitive plant surveys were completed in 2004 and 2005. No Sensitive plant species were found. There are 18 sensitive plant species with potential habitat in the 16 Road Project area. There would be No Impact on seven species. For nine species a determination of May Impact Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Species was made. This includes six species of moonwort *(Botrychium) ascendens, montanum, crenulatum, lanceolatum, minganense, and pinnatum*; two sedge species (*Carex) backii and parryana*; and Northern twayblade (*Listera borealis*). Two species, Clustered Lady Slipper (*Cypripedium fasciculatum*) and Least Phacelia (*Phacelia minutissima*), would experience a beneficial impact.

There is a finding of No Effect for threatened Northern Bald Eagle and endangered Gray Wolf. A finding of No Impact was reached for sensitive species California Wolverine, Pygmy Rabbit, Pacific Fisher, American Peregrine Falcon, Western Sage Grouse, Gray Flycatcher, Bobolink, Upland Sandpiper, Tricolored Blackbird, and Bufflehead.

A finding of May Effect, Not Likely to adversely Affect (NLAA) was made for threatened Canada Lynx. Three stands are proposed for treatment within the boundary of the Glacier Lynx Analysis Unit (LAU). The units are deemed non-habitat for lynx because of the grand fir plant associations, and would not result in further modification to the Glacier LAU. Informal consultation on Canada lynx was initiated in April, 2005 with U.S. Fish and Wildlife Service (USFWS). Details and the status of the 16 Road Project was presented at several Level 1 Team meetings with USFWS in attendance. The Biological Evaluation/Assessment of Threatened, Endangered, Proposed, and Sensitive Wildlife Species was submitted and reviewed by USFWS in July, 2006. Concurrence on the project was completed on September 26, 2006 using the Counterpart Regulations authorized under the Healthy Forest Restoration Act.

Activities May Impact Individuals or Their Habitat but Would Not Contribute to a Trend Toward Federal Listing of sensitive redband trout and Columbia spotted frogs. Implementation of prescribed burning would have potential minor impacts to these species and the habitat upon which they depend.

Proposed activities May Affect, but are Not Likely to Adversely Affect bull trout or its habitat in Crane Creek. Underburning activities within Riparian Habitat Conservation Areas (RHCAs) has the potential for a minimal increase in sediment. Informal consultation on bull trout was initiated in April, 2005 with U.S. Fish and Wildlife Service (USFWS). The 16 Road Project was discussed at several Level 1 Team meetings held during 2005 and 2006, with USFWS in attendance. The Biological

Assessment/Biological Evaluation Fisheries Report was submitted to USFWS for review in July, 2006. Concurrence on the project was completed on September 26, 2006 using the Counterpart Regulations authorized under the Healthy Forest Restoration Act.

10. *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.* I have examined this action and its relationship to HFRA, NFMA, ESA, NEPA, NHPA and related laws and find that my decision will not violate any federal, state, local laws or requirements for protection of the environment (40 CFR 1508.27 (b) 10). There are no known significant irreversible resource commitments or irretrievable losses of timber production, wildlife habitats, or water quality.

Consistency Findings

From the results of the site specific analysis documented in the environmental assessment, I conclude that:

1. No timber will be sold from land not suited for timber production (refer to 36 CFR 219.27 for definition).

2. All vegetation manipulation in the Project Area will comply with requirements of 36 CFR 219.27 (b).

3. The 16 Road Forest Health Project is consistent with Forest Plan direction, as modified by Regional Forester's Amendment #2 for the Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, dated June 5, 1995 and INFISH.

4. Public scoping was conducted and appropriate notices were published in the local newspaper, the Blue Mountain Eagle, for review of the project.

5. This decision is consistent with Forest Service Manual direction regarding roads analysis. I have determined that additional roads analysis is not needed for this project because the project makes no changes in access to the area and the project involves no permanent road construction or major reconstruction. Roads will be maintained as necessary to support project implementation.

6. The 16 Road Forest Health Project is consistent with the intent and purposes of Title I of the Healthy Forests Restoration Act of 2003. This project was identified as a priority through local collaborative processes. The project responds to specific fire-risk concerns identified by partners to the Grant County Community Fire Protection Plan. The project was reviewed and recommended as a priority by the Grant County Court and Resource Advisory Committee.

7. The project is not expected to have any disproportional effects on minorities or low income people nor will the project significantly affect consumers, civil rights or women (EA, pg. 98).

8. There are no inventoried roadless areas in the 16 Road Forest Health Project area (EA, pg. 93).

The 16 Road Forest Health Project Environmental Assessment is on file and available for public review at the Prairie City Ranger District Office, 327 South Front Street, Prairie City, Oregon. The EA is also available for review on the Malheur National Forest Internet Website at:

http://www.fs.fed.us/r6/malheur/projects/index.shtml

Administrative Review

This decision is not subject to appeal pursuant to 36 CFR 215.12 (Decisions and actions not subject to appeal). The objection process pursuant to 36 CFR 218 provided the sole means of administrative review for this HFRA project. This objection process has been completed.

Implementation of this project may begin immediately.

For further information about this project, contact Ryan Falk, Environmental Coordinator,

Prairie City Ranger District
P.O Box 337
Prairie City, Oregon 97869
Phone (541) 820-3800 Fax: (541) 820-3838

/s/ Steve Cossette — 9/28/06

Steve Cossette — **Date**
Acting District Ranger
Responsible Official

United States
Department of
Agriculture

Forest
Service

October 2006

Environmental Assessment

16 Road Forest Health Project

Prairie City Ranger District, Malheur National Forest
Grant County, Oregon

For More Information Contact:

Lance Delgado
Prairie City Ranger District
P.O. Box 337
337 SW Front Street
Prairie City, Oregon 97869
(541) 820-3800

Document Summary

The Prairie City Ranger District of the Malheur National Forest proposes the 16 Road Forest Health Project on National Forest System lands in Grant County, Oregon. The proposed project is located about 24 air miles southeast of Prairie City near Crane Prairie (see Figure 1).

Under applicable laws and public policies, the proposal addresses current forest health needs of the area, including reduction of both hazardous fuels and bark-beetle risk. It is the product of local collaborative processes, early public participation, and interdisciplinary design. The project would involve approximately 2,151 acres of forest management treatments and integrated conservation measures within a gross project area of 2,445 acres. Proposed treatments consist of various combinations of fuel burning, noncommercial and commercial thinning, and machine work for disposing and removing fuels. Integrated conservation measures are provided for cultural or historical sites, soil, water, fish, wildlife, range, native plants and trees, scenery, and recreation.

Following a public review period on the environmental assessment, a decision will be made whether to proceed with the project. If the decision is to proceed, it is anticipated that project operations could begin in late 2006, and continue intermittently for at least three additional calendar years (through 2009 or beyond).

This report provides details of the project, and describes its effects on the human environment. It was prepared according to policies and regulations implementing the National Environmental Policy Act (NEPA). Its purpose is to inform both the public and responsible Forest Service officials so that the following decisions can be made:

1. Whether the Forest Service has met NEPA procedural requirements to study and disclose effects of the proposed action and any alternatives on the quality of the human environment;
2. Whether any predicted effects are inconsistent with Forest Plan standards and guidelines or other applicable laws, regulations, and policies;
3. Whether any predicted effects amount to a significant adverse impact on the quality of the human environment; and
4. Whether to implement the action as proposed, to modify it, to develop another alternative, or do further environmental review.

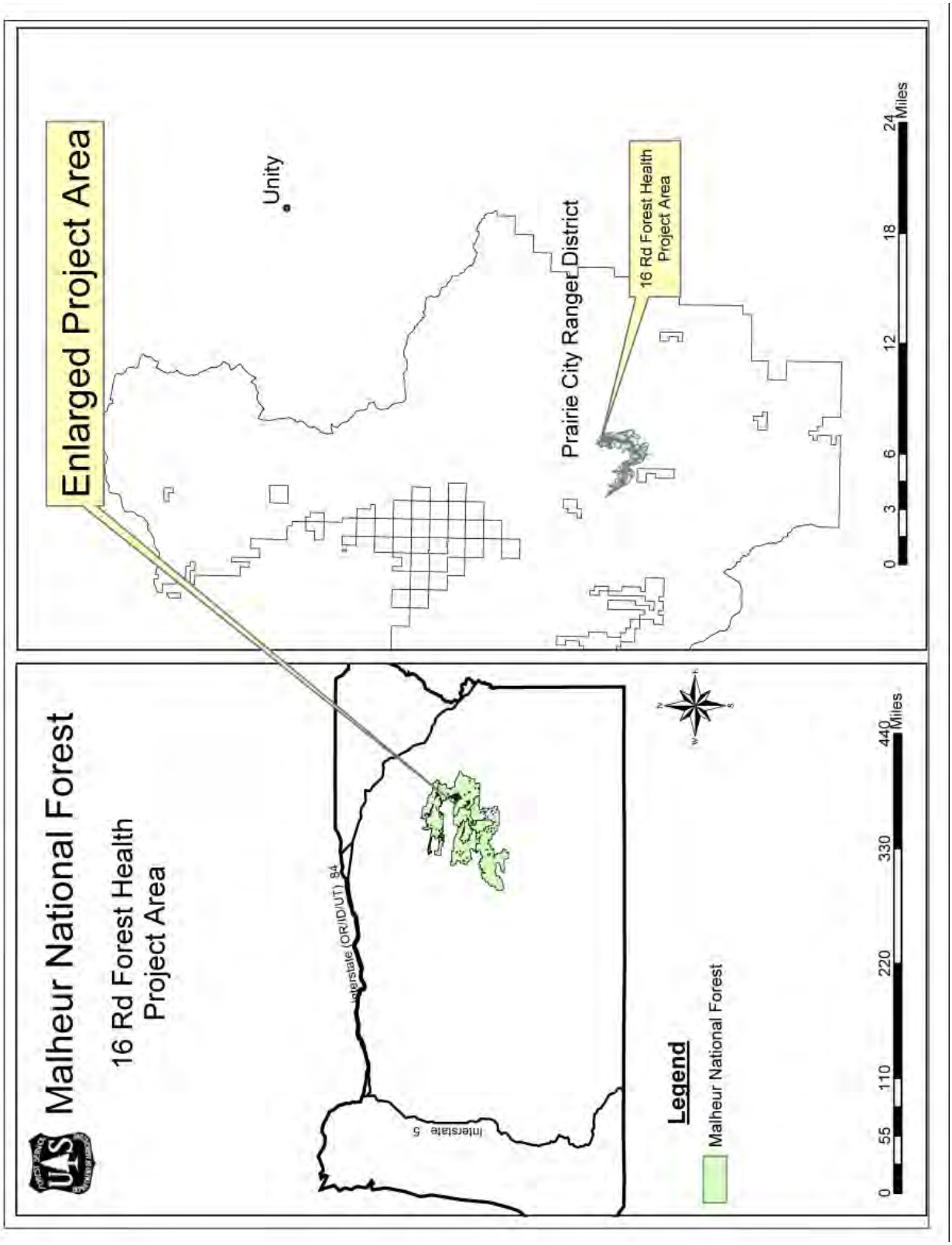


Figure 1. Vicinity map showing the location of the 16 Road Forest Health project area

Table of Contents

List of Tables

List of Figures

Part 1: Need for the Proposal

Project Purpose and Need for Action

The 16 Road Forest Health Project would take action on hazardous-fuel reduction and related needs in an area prioritized for treatment through local cooperative planning: The project area is a forested, public travel corridor identified in the Grant County Community Fire Protection Plan as containing a fire-evacuation route from an "at-risk community." The 16 Road Project Area is located approximately 37 road miles from the cities of John Day/Canyon City and 26 miles from Prairie City. The Federal Register identifies all three cities as at risk to urban interface fires. Between these Cities and the 16 Road Project are many homes with outbuildings, ranches, and cabins. Many of these dwellings are directly adjacent or intermingled with National Forest lands. The highest concentrations of homes interfacing with the National Forest are located along Highway 395 (South of John Day/Canyon City), County Road 65 (along Canyon Creek – South of John Day/Canyon City), and County Road 62 (South of Prairie City). In event of a wildfire the 16 Road could serve as the evacuation route for the residents of homes. The Malheur National Forest annually experiences severe thunderstorms. It is not uncommon for several fires to ignite during a single storm. During the last two decades the Malheur Forest has experienced several multiple fire situations where main roads were blocked by wildfire. During the 2002 fire season, the High Roberts Fire burned across County Road 62, blocking traffic, resulting in the road being closed. During the same lightning storm the Monument Fire burned down to the 16 Road. This portion of the 16 Road had recently been thinned and underburned, moderating the wildfire intensity, resulting in an effective place for firefighters to control the fire. The 16 Road may also serve as an alternate transportation route in event of a wildfire in the Highway 26 or Highway 395 corridors. In close proximity to the 16 Road Project are two Forest Service Guard Stations and private lands containing structures. The Crane Prairie Guard Station is located adjacent to the project area.

The project would implement direction of the Land and Resource Management Plan of the Malheur National Forest (Forest Plan; USDA Forest Service 1990), which represents the preferred alternative of the Final Environmental Impact Statement, approved May 1990, and which provides direction for management of the Forest and general discussions of the associated environmental impacts. The project would also implement direction provided by amendments to the Forest Plan that are currently in effect, requirements of other applicable laws and public policies, and advice obtained through local collaborative project planning. Under this direction, the project would serve the following purposes:

1) Reduce the risk of loss to an evacuation route, private property, and public facilities and resources in or near the project area, by creating forest conditions that would moderate potential wildfire intensity and allow firefighters a good chance of controlling fires in this area; and

2) Reduce the risk of uncharacteristically intense fire behavior resulting from fuel accumulations of future bark beetle caused mortality by decreasing the susceptibility of forest stands to bark beetle outbreaks.

To serve these purposes, particular forest management needs are indicated, to change current conditions toward desired conditions. These needs are as follows:

- Reduce, and break up the continuity of, woody debris on the ground that provides the basic fuel for wildfires.
- Reduce the density of lower- and mid-level trees that can help wildfires climb and torch the crowns of upper-level trees.
- In selected stands, reduce the density of upper-level trees than can help sustain a crown fire.
- In timber stands with average tree size and density at levels considered high-risk for bark-beetle activity that would kill trees and add to current fuel problems, reduce the density to a lower risk level within the range of densities recommended for productive management of the tree species present.
- Sell timber or other raw forest products to remove excess trees through commercial treatments where viable, to recover the value of these trees, and to benefit the forest products economies of nearby communities.
- Maintain sufficient stocking of forest vegetation to fully occupy suitable timber-growing sites.
- Implement standards of resource management and environmental protection applicable to the area.

Legal Authorization and Policy Framework

Overview

The Land and Resource Management Plan of the Malheur National Forest (Forest Plan, USDA 1990) represents the preferred alternative of the Final Environmental Impact Statement – Malheur National Forest, approved May 1990, and provides direction for management of the Forest and general discussions of associated environmental impacts. This EA tiers to and relies upon the analysis found in the 1990 Final Environmental Impact Statement for the Malheur National Forest Land and Resource Management Plan. Amendments include, but are not limited to, the Regional Forester's Forest Plan Amendment No. 2 (USDA 1995a) and the Inland Native Fish Strategy (INFISH, USDA 1995b). The Forest Plan provides the basic direction and standards for management of the Malheur National Forest. It was developed under authority of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), and regulations implementing NFMA. In keeping with the Forest Plan, this project is framed to be consistent with all other laws or policies governing national forest management generally and Forest Service operations on lands administered by the Malheur National Forest in particular. These other laws or policies include the federal Clean Air Act and State of Oregon Smoke Management Plan, the Clean Water Act of 1987, the Inland Native Fish Strategy (USDA Forest Service 1995; which amended the Forest Plan), the Endangered Species Act of 1973, the National Historic Preservation Act of 1966, and the Record of Decision—Pacific Northwest Region Final EIS for the Invasive Plant Program, among others. This EA is also tiered to a broader scale analysis (the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Malheur National Forest Plan by adding management direction relative to invasive plants.

This project is proposed to make progress toward various public goals embodied by the 1990 Forest Plan and its associated amendments. Additionally, as a forest health project, this proposal is specifically designed to serve public purposes outlined by the National Fire Plan of 2000

(NFP), The President's Healthy Forests Initiative for Wildfire Prevention and Stronger Communities of 2002 (HFI), and the Healthy Forests Restoration Act of 2003 (HFRA).

Environmental review of the proposal, including this assessment, is being conducted as required by the National Environmental Policy Act of 1969 (NEPA). This includes compliance with NEPA-implementing regulations of the Council on Environmental Quality (CEQ) at 40 CFR Part 1500 and application of the following guidance: CEQ's Guidance for Environmental Assessments of Forest Health Projects of December 9, 2002; CEQ's Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005; and Forest Service Handbook 1909.15—Environmental Policy and Procedures Handbook. Additionally, provisions of the Healthy Forests Restoration Act of 2003 pertaining to environmental analysis are applicable to this project.

Healthy Forests Restoration Act—Authorized Projects

The Healthy Forests Restoration Act of 2003 (P.L. 108-148) was enacted in part to prioritize and expedite projects on federal lands to enhance forest health and reduce wildfire threats to communities, watersheds, forest and rangeland resources, and threatened or endangered species.

The 16 Road Forest Health Project is an authorized hazardous fuel reduction project under HFRA because it would use appropriate methods to reduce hazardous fuels on qualifying federal lands. Federal lands in the project area qualify for two separate reasons—that is, they pass two of the several individually qualifying "tests" provided by HFRA, as follows:

1. **"WUI" Test:** Project-area lands are considered part of a wildland-urban interface (WUI), because they are adjacent to an evacuation route (Forest Road 16) for an at-risk community identified in the Grant County Community Fire Plan, and they require fuel reduction to make this evacuation route safe.
2. **"T&E Species" Test:** Project-area lands contain habitat of a threatened species (bull trout); the project would provide appropriate management and protection of this habitat per federal guidelines; and it would reduce the threat of severe fire effects to this habitat.

HFRA-authorized fuel projects must be designed to retain or culture old-growth forest structure and large trees according to provisions in the law (explained in more detail in the "Desired Conditions" section). Additionally, authorized projects must be conducted consistent with all current laws or policies governing forest management in the area, as outlined in the preceding section.

HFRA says that the U. S. Department of Agriculture, Forest Service shall "as soon as practicable after the date of enactment of this Act…implement authorized hazardous fuel reduction projects…." To expedite authorized projects, the law requires collaborative planning. It also contains provisions that may in some cases streamline the environmental review of a project. These provisions include: limits on appropriate alternatives that may be considered; and internal, administrative review of any objections to a project before a decision is made to approve it or carry it out (as opposed to post-decision appeals).

HFRA, Section 102 (e), states that…"if the management direction in a resource management plan (Forest Plan) for an old growth stand was established before December 15, 1993, that HFRA covered projects shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth

conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure." And, review management direction for covered HFRA projects, taking into account any relevant scientific information made available since the adoption of the management direction; and amend the management direction to be consistent with pre-fire suppression old growth conditions, if necessary to reflect relevant scientific information. Consistency with this direction is addressed in Part 3, Forest Vegetation section of this document.

Collaboration—Project Development

In keeping with principles of NFP, HFI, and HFRA, this project has been identified or affirmed as a current priority through local collaborative processes. In addition to responding to specific fire-risk concerns identified by partners to the Grant County Community Fire Protection Plan, the project was reviewed and recommended as a priority by the Grant County Court and Resource Advisory Committee. Subsequent to that, a collaborative planning meeting was held in John Day, Oregon on Sept. 23, 2004 for all interested parties, at which participants provided relevant information, ideas, and concerns that helped shape the proposal. The meeting concerned both the 16 Road and Pine Creek WUI projects.

At the collaborative planning meeting, participants asked the Forest Service whether a project at 16 Road that only addressed hazardous fuel reduction, and which relied heavily on noncommercial thinning and underburning and only limited commercial thinning, would meet all fuels reduction needs of the area. Participants asked whether there were additional methods that should be considered, that might yield more raw forest products needed in the local area economy. Forest Service specialists familiar with the area informed the group that the area contained many timber stands with average tree sizes and densities considered to be risk factors for damaging bark-beetle activity, and that bark beetles were present at endemic levels—that is, common but not epidemic, currently killing scattered, individual trees or small pockets of trees. The Forest Service personnel also explained that tree mortality from bark beetles would likely increase in the near term unless stand densities were reduced. This bark beetle mortality would add to fuel loads, increasing fire intensity and resistance to control.

Subsequent oral and written comments from participants encouraged the Forest Service to address all current resource-management needs of the area consistent with Forest Plan direction, and to use treatments or methods that would support commercial activity in conjunction with treating fuel hazards.

This collaborative advice was closely considered by the Forest Service and ultimately led to expanding the scope of the 16 Road Project to include reducing the risk of loss to timber and other forest values from bark-beetle activity. This objective was added both to make the proposal more responsive to all applicable management direction of the Forest Plan and to keep the current fuel problem from becoming worse, or recurring, as a result of beetle-killed trees. In addition to encouraging the Forest Service to enlarge the scope of the project as described above, participants also contributed information and ideas that helped define actual proposed treatments adjacent to Forest Road 16.

All of the above-described collaborative work was performed at the project development stage, to help formulate the proposed action—that is, prior to external "scoping" (review and comment) of a proposed action.

Current Conditions

The project area is a forested, public travel corridor created by Forest Road 16, with the largest portion of the area being managed as a "visual corridor" under the Forest Plan. One of the goals for this corridor is scenic quality featuring large-diameter trees (the visual corridor involved is called Glacier Loop; Forest Road 16 forms a part of this loop). Private land and a Forest Service fire guard station lie adjacent to the scenic travel corridor at Crane Prairie. Forest Road 16 in this area is also an identified fire-evacuation route under the Grant County Community Fire Protection Plan.

In relation to the historic role of fire, the entire project area is classified as one in which surface fires, as opposed to crown fires, were most common. Historic fires in this area typically occurred at intervals of less than 35 years, including both lightning-caused fires and periodic burning by American Indians. Such fires were of low to mixed severity, resulting in much fuel consumption yet survival of a substantial portion of the upper-level large trees. By contrast, the prevailing, current fuel condition (87 percent of the area) is highly departed from these historic characteristics, meaning there is considerable fuel on the ground and the forest is relatively dense at one or more vertical levels, albeit with some differences between stands. Overall, these conditions create a risk for uncharacteristically intense fire behavior should a fire occur, and a related risk for severe fire effects on both natural resources and man-made improvements. The current conditions also pose a generally high near-term risk that timber stands of the area will experience bark-beetle outbreaks, especially during droughty periods. Bark beetles are currently present at endemic population levels, killing scattered individual or small pockets of trees, and are expected to increase unless stand densities are generally reduced. More dead or dying trees from bark-beetle attacks would add to the current fuel hazard and its potential fire impacts.

Public values currently at risk from an uncharacteristically intense wildfire in this area include:

- A safe fire-evacuation route
- Adjacent private property and public utilities
- A Forest Service fire guard station
- The scenic quality of the Glacier Loop visual corridor along Forest Road 16
- The habitat of bull trout (a threatened or endangered species), and other fish
- Old-forest structure and related wildlife habitat currently developing in some stands
- Soil properties on which productive forest growth depends
- Surrounding timber stands of various age-classes representing past investment of Forest Service management and public funds

Public values currently at risk from bark-beetle outbreaks are the same as from fire, as this factor would add to current fuel hazards.

Desired Conditions

The following sections outline desired conditions as directed by public policy and as further developed through project-level planning for reduction of fuel hazards and bark-beetle risk. Further details concerning desired conditions for particular forest resources are compiled, displayed, and discussed in specialist reports underlying and supporting this EA. These reports are located in the project record at the Prairie City Ranger District Office (see contact information on inside cover page).

Direction from the Forest Plan

The Forest Plan indicates desired conditions through goals for management areas (MAs). A management area is a designation to which geographic parts of the forest are assigned; it describes the forest uses and benefits to be emphasized at these locations, in combination with other compatible uses or benefits. The project area comprises parts of three MAs, as shown in Figure 2; primary goals and desired forest conditions for each of these MAs are as follows (in order of abundance):

- **MA 14—Visual Corridors (1,890 acres): Manage corridor view-sheds with** primary consideration given to their scenic quality and the growth of large-diameter trees. Road 16 is part of Glacier Loop visual corridor, a sensitivity 2 visual corridor. Forest Plan Correction #1 allows commercial thinning in visual corridors without a corridor management plan.
- **MA 1—General Forest (335 acres):** The primary goal is sustained-yield timber production involving a distribution of forest age-classes, each growing in a healthy condition.
- **MA 3A—Non-Anadromous Riparian Areas (219 acres):** The primary goal is protection or enhancement of water quality, fish habitat, and wildlife habitat near water, including conservation of both the land and water features and the naturally occurring tree and plant cover that contributes to these qualities.

Direction from Regional Forester's Forest Plan Amendment #2

Adding to basic direction from the 1990 Forest Plan is the 1995 Regional Forester's Forest Plan Amendment #2: Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales. This policy expands and more clearly defines the protection areas bordering streams or other water bodies; it also introduces desired conditions for wildlife habitat, including stands formed or structured with the characteristics of late and old stages of forest succession. Additionally, special forest cover areas for wildlife between late and old structure areas, called connection corridors, are required. Forest Plan Amendment #2 direction does not apply to prescribed burning or pre-commercial thinning activities.

How much, and where, these wildlife-related conditions should occur is determined by reviewing the "historic range of variability" (HRV) for the area. This is an assessment of the physical growing sites represented, and the patterns of forest vegetation that historically occurred there. It includes consideration of site differences (warm and dry, cool and moist, etc.) and associated disturbance factors such as fire, insects, and diseases that affect the establishment and natural development of forest stands. With the HRV assessment in hand, the current assortment of conditions can be compared to their historic range of variability, or occurrence. Projects can then be planned to either maintain current condition patterns—if they are within the desired historic ranges—or change them to imitate historic patterns by increasing or decreasing various conditions through timber harvest, burning, or other treatments.

An HRV assessment of the Crane Creek subwatershed, which contains the project area, revealed that some of the desired late and old structure conditions, on warm-dry and hot-dry sites, are not well represented (acreage of these conditions is below the historic range of variability for the ecosystem). The project area itself supports many stands that are approaching desired late and old structure characteristics, including large trees, but which are not yet in a late or old structure condition-class. Thus, it is desired to maintain or enhance stand conditions approaching late and old structure characteristics, and establish future connection corridors between them.

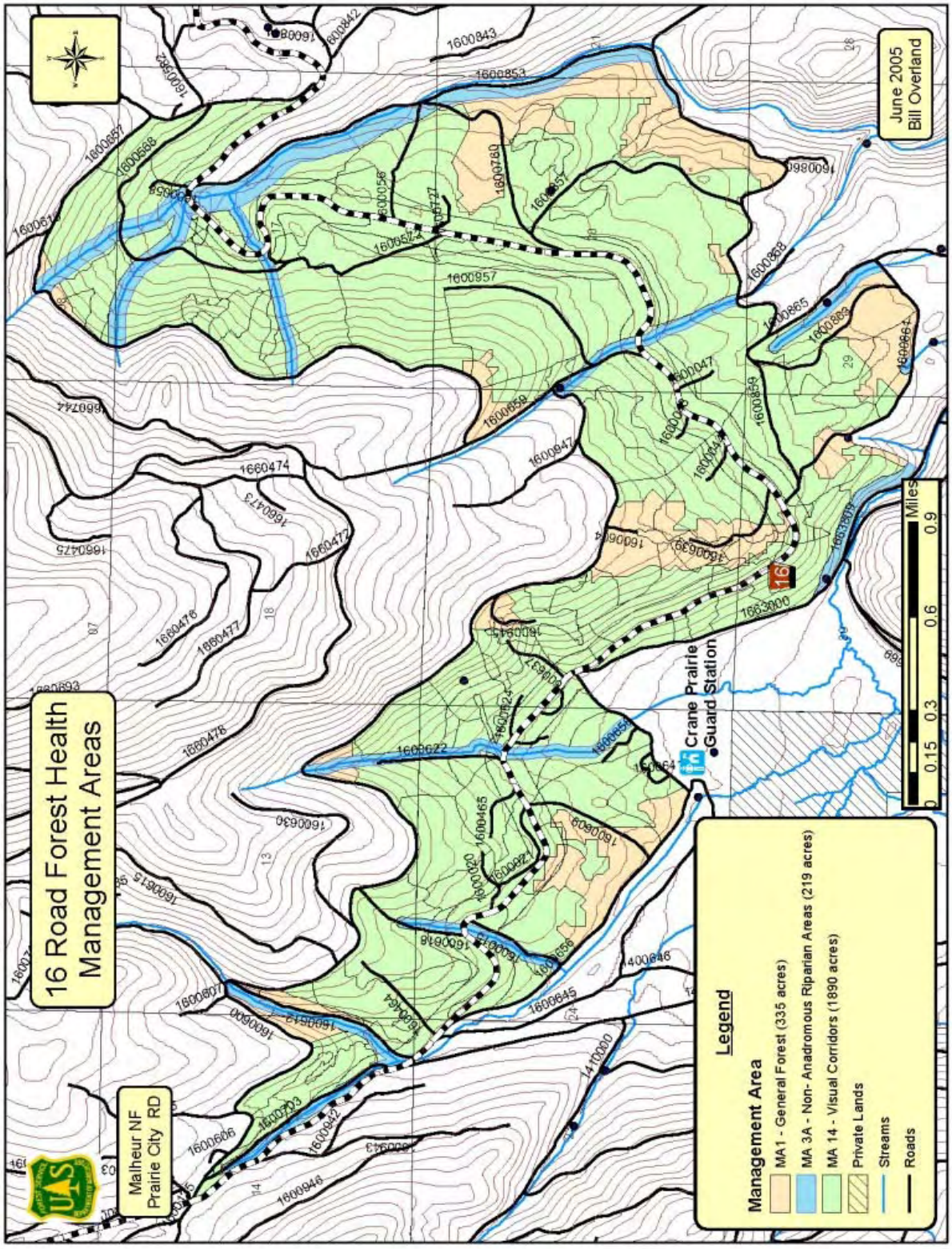


Figure 2. Map of management area designations within the project area

Direction from the Healthy Forests Restoration Act

Hazardous fuel reduction projects authorized under HFRA must be designed to maintain or culture old-growth forest structure in current old-growth stands, according to how these stands typically appeared before the modern fire-suppression era (the project area does not contain any designated old-growth forest). Additionally, projects must be designed to retain large trees of fire-resilient species appropriate to the forest type (mainly ponderosa pine in this case) while removing mostly smaller trees. The purpose of these requirements is to imitate historic forest conditions that contributed to the natural functioning of fire-adapted ecosystems over large areas. Public benefits intended by these forest conditions are less-intense wildfires in the future, and as a result, less-severe impacts to both natural resources and human environmental values, including private property or public infrastructure.

Desired Fuel Conditions and Potential Fire Behavior

Surface Fuels

Based on a review of the historic role of fire in this area—which includes a fire-return interval of less than 35 years ("Fire Regime 1"), and technical guidelines applicable to this predominantly dry forest environment, it is estimated that surface fuel loads should be in the range of approximately five to eight tons per acre, with half or more of this woody debris consisting of pieces larger than three inches in diameter. Correspondingly, duff accumulations (surface organic residues such as needles, leaves and small twigs) should be relatively low.

Canopy Fuels

Canopy base height (the height to the base of the live forest canopy) and canopy bulk densities (the combined weight of tree crowns above an area) are the best measures for helping predict crown fire potential. Historically, canopy base height would have been maintained at sufficient height from frequent fires that only occasional torching in less fire-adapted trees would occur (such as grand fir with low, live branches versus ponderosa pine). Canopy bulk density would have been sufficiently low that even if surface flames were high enough to reach the crowns, fire wouldn't spread in a stand-replacing type of crown fire. Historic crown-fire potential in Fire Regime 1 would have been minimal.

Potential Wildfire Behavior

The desired condition is one in which the intensity of a wildfire burning on a hot, dry, breezy day would depend mainly on grasses, pine needles, and small-diameter woody debris—as opposed to larger surface fuels or live tree crowns—and the intensity would vary across the landscape. Such a fire would remain primarily as a surface fire, with potentially high rates of spread but causing only low impacts on soils or large, fire-resilient trees. Compared to a passive or active crown fire, such a fire would have short spotting distances and would show much less resistance to control.

Desired Forest Composition and Stocking Levels

The desired condition over the project area is a mosaic of even-aged and uneven-aged forest stands with a high level of visual diversity in the foreground of Forest Road 16. Stands in the area should be within the historic range of variability for stages of late and old forest structure, and large trees should be common. Stands should be generally healthy and vigorous due to stocking control, with a low risk of developing epidemic levels of bark beetles, and only scattered, individual trees or small pockets being occasionally attacked or killed. Stand species

compositions would reflect those expected on these forest sites given the historic fire regimes. Thus, most of the area would be dominated by ponderosa pine with minor components of other species, except for the cool-dry and cold-dry forest environments where a mixed-conifer forest would be supported.

Part 2: Proposed Action and Alternatives

Project Proposal—Public Review and Comments

On February 17, 2005, the project proposal and invitation to comment as part of the scoping process was issued and mailed to approximately 220 interested individuals, organizations, state and federal agencies, and tribal offices.

Under the project purpose and need for action stated above, the proposal recommended approximately 2,170 acres of forest-management treatments and integrated conservation measures within a gross project area of 2,445 acres. Proposed treatments consisted of various combinations of fuel burning, noncommercial and commercial thinning, and machine work for fuel disposal or removal. Integrated conservation measures were provided for cultural or historical sites, soil, water, fish, wildlife, range, native plants and trees, scenery, and recreation. The full proposal and cover letter are in the project record. Two parties responded to the proposal, one by letter, and one by email.

See Appendix A for a summary of relevant external comments received. The summary includes editorial notes explaining how the Forest Service considered or applied the comments to assure environmental quality in the affected environment.

Public participation in this project is open-ended, and continues through all stages of project development, decision-making, and implementation.

Scope of the Environmental Analysis

NEPA implementing regulations of the Council on Environmental Quality (CEQ) say: *"Scope consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement."* (40 CFR § 1508.25)

Forest Service NEPA policy defines scoping as *"The procedure by which the Forest Service identifies important issues and determines the extent of analysis necessary for an informed decision on a proposed action"* (FSH 1909.15).

Upon reviewing public comments and reevaluating the proposed action, the interdisciplinary team, with the consent of the responsible official (district ranger), focused the scope of the analysis on the following elements:

- **Refinements to the proposed action,** to clarify or ensure that it would serve the stated purpose and forest-management needs in a manner consistent with applicable standards
- **Additional design features, conservation measures, or monitoring requirements** to be applied to the proposed action, in order to avoid, reduce, or compensate for any potential adverse effects it may have on the quality of the human environment
- **Issues or concerns about the proposed action,** the significance of which remain to be determined after refining the proposed action or applying additional design features, conservation measures, or monitoring requirements

- **Alternatives to the proposed action,** or other reasonable courses of action that would respond to the project purpose and forest-management needs and offer feasible remedies to any remaining, significant issues
- **Physical, biological, economic and social components of the human environment that may be affected by the project,** which should be addressed in the environmental analysis

Each of the above-listed elements of scope is discussed in detail in the following sections.

Proposed Action (Revised)

The proposed action is a set of treatments, design features, and conservation measures developed by an interdisciplinary planning team in direct response to the project purpose and forest-management needs. Whereas the project was identified, prioritized, defined and proposed through local collaborative processes, this action at this location would implement recommendations of the partners to the Grant County Fire Protection Plan, and those of other interested parties who participated in project planning.

As stated in the February 2005 proposal document, proposed treatments consist of various combinations of fuel burning, noncommercial and commercial thinning, and machine work for fuel disposal or removal. All built-in design features, conservation measures, and monitoring requirements are presented in Part 3: Environmental Impacts of the Proposed Action and Alternatives, under the particular environmental components or natural resources to which they pertain. A combined list comprising all such measures is in Appendix B.

Refinements and Additional Design Features, Conservation Measures, or Monitoring Requirements

Following public review of the proposal, the interdisciplinary team made refinements to the proposed action and added particular design features, conservation measures, or monitoring requirements. These were based on both additional internal review and consideration of relevant external comments (Appendix A summarizes individual external comments and explains their relationship to some of the changes outlined below). The refinements and additions were made to clarify or ensure that the proposed action would serve the stated purpose and forest-management needs in a manner consistent with applicable standards, or to avoid or reduce potential adverse effects to certain environmental values. The revised proposed action reflects the following refinements or added features:

- **More-detailed design with respect to certain wildlife conservation measures, including goshawk nesting habitat and post-fledgling areas (PFAs), late and old structure (LOS) candidate stands and connection corridors, and pileated woodpecker habitat.** These detailed design considerations caused the team to change some previously proposed treatments involving commercial or noncommercial thinning to underburning only, in order to maintain canopy-cover requirements in medium-density stands. In other stands, these considerations did not change the proposed treatment, but resulted in the team identifying detailed habitat requirements and corresponding design strategies to be applied to the proposed treatments.
- **Detailed logging-feasibility and resource-protection considerations resulted in some previously proposed commercial thinning treatments being limited to noncommercial thinning or underburning only.** As a related consequence, cable logging is no longer planned as part of the action.

- **An additional archeological site requiring protection has been identified and proposed treatments have been deferred in this area.**
- **Winter logging has been adopted as a basic requirement for all proposed commercial thinning,** to help attain desired conditions and standards for scenery management and protection of the soil resource. "Winter logging" means sufficient snow is present to prevent compaction or disturbance to the soil surface. Specific acceptable conditions to meet scenery and soil objectives would be detailed in a winter logging agreement between the Forest Service and the contractor(s).
- **Standards for riparian habitat conservation areas (RHCAs; protected areas near streams or other water) will be followed to protect and avoid impacts on any previously unidentified water features** that may be encountered during project operations.
- **Horizontal hiding cover for big game will be provided to compensate for reduction of canopy cover by the revised proposed action.** Hiding cover will be provided as necessary by retaining untreated patches of forest trees throughout the project area, with emphasis on relatively flat topography and around existing snags for their further protection.
- **Commercial and noncommercial thinning treatments proposed in visual-corridor foreground areas along Forest Road 16 will use variable spacing for retention trees** to avoid unnatural-looking vegetation patterns.
- **On slopes facing Forest Road 16, slash-burn piles will be placed up to 50 feet away from the road where practicable,** to reduce visual impacts.
- **During winter operations, an alternate snowmobile route will be designated** to substitute for the short-term loss of snowmobile use on Forest Road 16 and other connected roads on or near the project perimeter that area designated as snowmobile routes in winter.

As a result of these refinements or added features, the revised proposed action reflects the following differences in estimated treatment acreages, compared to figures in the February 2005 proposal document:

- **Total acres proposed for treatment have decreased slightly,** from the previous estimated total of 2,170 acres to a revised estimated total of 2,151 acres, a reduction of 19 acres or 1 percent.
- **Proposed treatments involving commercial cutting have decreased** from the previous estimate of 1,504 acres to 1,218 acres, a reduction of 286 acres or 19 percent.
- **Correspondingly, proposed treatments involving only noncommercial cutting or underburning have increased** from the previous estimate of 666 acres to 933 acres, representing an increase of 267 acres or 40 percent.

Proposed Vegetation and Fuels Treatments

All currently proposed treatments are listed in Table 1. In addition to some acreage differences from the February 2005 proposal caused by the refinements or additions discussed in the preceding section, the table includes some minor corrections to treatment descriptions. Proposed treatments are further defined and located as shown on the proposed action map (Figure 3).

Please note that the treatments in the table and on the map are actually *combinations* of individual forest-vegetation or fuels treatment types, or silvicultural methods; these are to be performed in conjunction with each other, or in sequence, within a given unit on the ground, to achieve the various objectives that apply to that specific location. Treatment combinations or other detailed specifications for individual stands were prescribed with consideration of such factors as tree species, size, density, age, down woody fuel loadings, access, slope, and

topographic location. Additionally, certain treatments have a primary resource emphasis, or special management objective, according to location. For example, along Forest Road 16 (within 300 feet of either side), special treatments for roadside scenery management are provided; these would involve noncommercial, low thinning prior to prescribed burning, to better control retention-tree stocking and mortality; or, post-burning cutting and removal of noncommercial-size trees that have died due to burning.

The many individual treatment types or silvicultural methods making up these combinations are considered design features within the larger combined treatments; as such, details concerning each of them are described under "Forest Vegetation Design Features, Conservation Measures, and Monitoring Requirements" in the Vegetation section of Part 3.

Also included in the referenced section of Part 3 are detailed descriptions of conservation measures to restore certain vegetation components, such as quaking aspen or native shrubs. These conservation measures apply where the opportunity or resource conditions exist, usually as micro-patches, in conjunction with proposed treatment combinations that apply to the larger surrounding stand. In the case of aspen, surveys have been completed and there are 29 identified restoration sites totaling 68 acres, distributed throughout the project area. They are not shown on the proposed action map due to problems of scale; specific locations are recorded in the project record. In the case of proposed native shrub restoration, applicable sites would be located through pre-implementation surveys.

A conservation measure that applies wherever commercial thinning is proposed is borax treatment of freshly cut stumps, to prevent the spread of annosus root rot that could kill retained trees. Details of this measure also are described in the above-referenced section of Part 3, under HTH (Commercial Thinning).

Thinning Methods and Intensities

All proposed thinning—both noncommercial and commercial—would be conducted using low-thinning methods, which remove mainly lower- or mid-level trees to favor and redistribute growth potential to upper-level large trees. Trees to be removed would be those currently contributing to crown-fire potential or bark-beetle risk, up to a size limit of 21 inches in diameter at breast height (DBH); a limited number of trees larger than 21 inches DBH may be removed if necessary for temporary road development, hazard tree removal, or log landings, as provided by current policy. The thinning would retain an increased proportion of fire-resilient species such as ponderosa pine, while still maintaining a variety of native tree species currently present.

The intensity of commercial thinning proposed for bark-beetle risk reduction was determined by following stocking-level guidelines recommended by Cochran et al. (1994) and further quantified by Powell (1999). These were used to establish upper management zones (UMZ) and lower management zones (LMZ) in terms of stand density index (SDI). Stand densities approaching the lower management zone provide full occupancy of the growing-site with low risk of bark-beetle activity. These density levels also fall within the historic range of stand densities for this area and thus would promote historic structural characteristics. Therefore, proposed commercial thinning for bark-beetle risk reduction is designed to approach the lower management zone of stand densities. In many stands, the proposed thinning is modified; however, to retain somewhat more density or a greater proportion of large trees; these measures ensure consistency with the overall policy framework and standards applicable to the area.

Table 1. Proposed treatments—16 Road Forest Health Project

Proposed Treatments	Treatment Codes (On map)	Est. Acres
Underburning at low or moderate intensity	FUB	705
Underburning at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small fire-killed trees where needed for scenery benefits	FUB, FHB	128
Noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	SPC, FMT, FUB, FHB	10
Noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity	SPC, FMT, FUB	20
Noncommercial thinning; slash lopped & scattered; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	SPC, LS, FUB, FHB	27
Noncommercial thinning; slash lopped & scattered; later underburned at low or moderate intensity	SPC, LS, FUB	43
Commercial thinning; slash lopped & scattered; later underburned at low or moderate intensity	HTH, LS, FUB	105
Commercial thinning with whole-tree removal; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	HTH, WT, FUB, FHB	61
Commercial thinning with whole-tree removal; later underburned at low or moderate intensity	HTH, WT, FUB	606
Commercial & noncommercial thinning; fuels hand-piled & burned; later underburned at low or moderate intensity	HTH/SPC, FHB, FUB	30
Commercial & noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity, followed by hand-cutting and hand-piling & burning of small, fire-killed trees where needed for scenery benefits	HTH/SPC, FMT, FUB, FHB	55
Commercial & noncommercial thinning; fuels removed or piled by ground-based machines; later underburned at low or moderate intensity	HTH/SPC, FMT, FUB	361
All Proposed Treatments		**2,151**

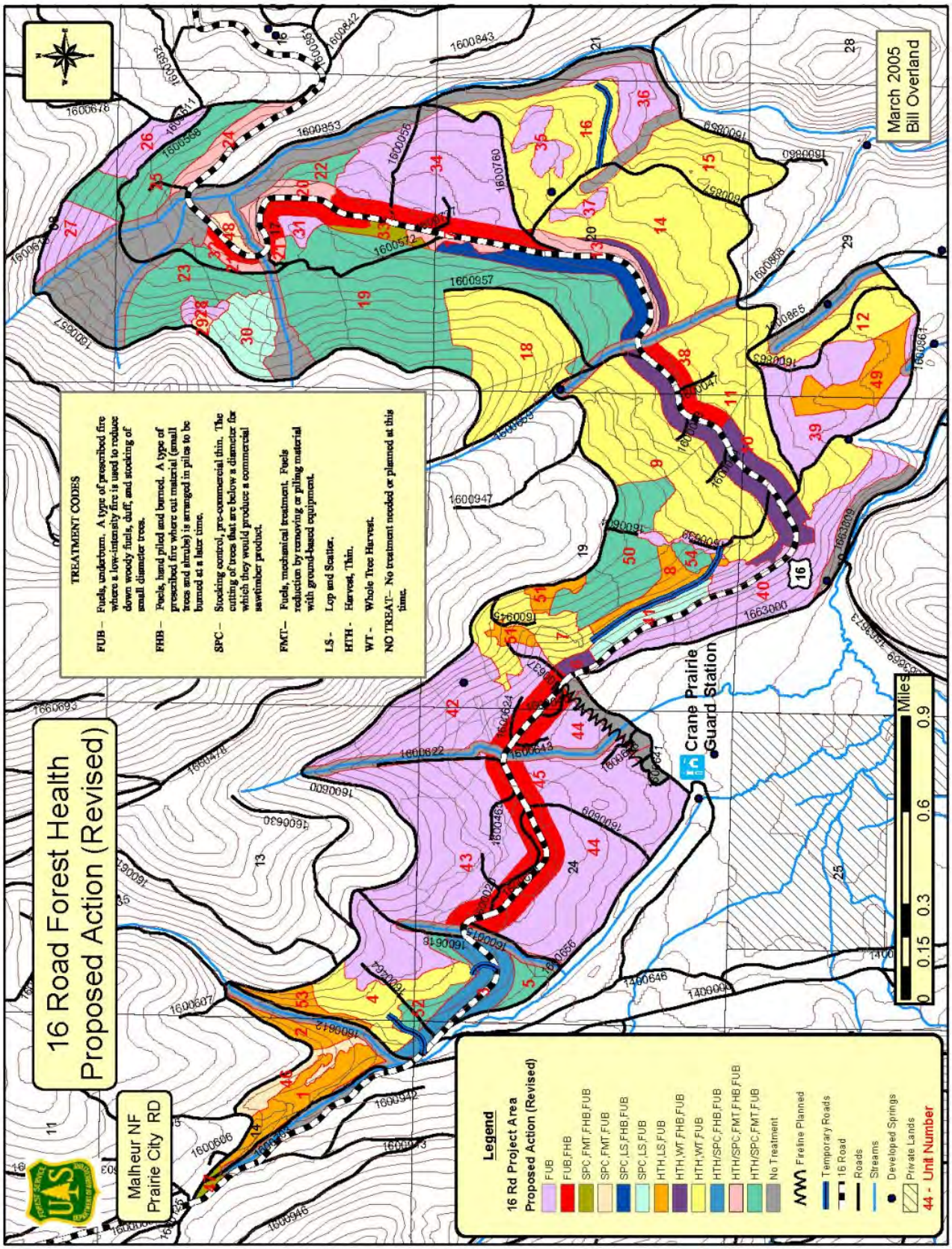


Figure 3. Map of proposed action for the 16 Road Forest Health Project

Timber Sales—Logging Systems—Roads—Landings—Other Contract Work

The original proposed action estimated that 4.7 million board feet of sawlogs or other forest products would be produced. Refinements to the proposed action have reduced the planned amount of commercial cutting; consequently, the estimated volume has decreased by 38 percent from earlier estimates, down to 2.9 million board feet. These raw products would be sold at bid value, most likely to timber buyers or forest products manufacturers of the local area. Sawlog-size material designated for cutting would be removed through one or more timber purchase contracts under Forest Service supervision.

The commercial thinning and mechanical fuels treatments would be accomplished using ground-based logging equipment; specifically, a combination of mechanized harvesters, rubber-tired skidders, and boom delimbers would most likely be used to remove commercial-sized material and to treat the associated slash. Non-commercial mechanical fuels treatments may be accomplished by removing material to designated landing zones using the above-mentioned equipment, or by piling the slash on-site using a machine equipped with a boom and grapple.

Many of the proposed treatment areas have been managed for timber production in the past; thus a number of roads, skid trails, and landings are already present. These roads, skid trails, and landings would be utilized wherever possible and appropriate to reduce new ground disturbance; consequently, no new permanent road construction is proposed. New *temporary* roads are proposed; however, at the two locations shown on the proposed action map. The temporary roads would facilitate proper ground-based skidding and provide locations for some new landings that would be needed; a combined total of up to one mile of new temporary road may be developed. Neither of the two locations for proposed temporary roads involves riparian areas or stream crossings.

Landing size would vary depending upon the volume of cut trees being removed. Also, treatments involving whole-tree skidding require larger landings in order to accommodate equipment and large slash piles. In treatment units that leave slash in the woods to be piled or burned, landings can be much smaller and may not require construction.

Upon completion of logging and other mechanized treatments, currently closed roads that were opened to support project operations would be re-closed; temporary roads would be rehabilitated and closed; and landings would be rehabilitated. All integrated design features and conservation measures involving roads or road maintenance, skid trails, or landings are listed in Appendix B under the headings “Roads,” “Forest Fire Hazards,” “Soil and Water,” “Noxious Weeds,” or “Scenery and Recreation.”

The special treatments for roadside scenery management would be performed through contracted services or Forest Service labor. Where these involve removal of non-sawlog-size trees that have died due to burning, they are proposed in part to allow roadside retrieval and utilization of any materials for which there is a market or permitted use. All such removal operations or roadside hand-retrieval of stockpiled, utilizable materials would be under Forest Service supervision and controlled by stipulations to conserve roadside scenic qualities, wildlife habitat components such as snags and down woody debris, and other resource qualities as required by forest standards and the built-in design features, conservation measures, and monitoring requirements of the proposed action (Appendix B).

Issues

An issue, as it relates to the NEPA process, is a point of disagreement, debate, or dispute with the proposed action. To help determine the scope of the environmental analysis and focus it, issues are divided into two groups: nonsignificant and significant issues.

Nonsignificant issues include concerns about effects of proposed activities on the human environment that are remedied by refining the design of the project or by applying additional conservation measures or monitoring requirements. They also consist of disagreements determined to be: 1) outside the scope of the proposed action, 2) already decided by law, regulation, Forest Plan, or other higher level decision, 3) irrelevant to the decision to be made, or 4) conjectural and not supported by scientific or factual evidence.

Significant issues are relevant unresolved conflicts concerning alternative uses of available resources (NEPA § 102(2)(E)), or relevant widespread or intense concerns about effects of the proposed action on the quality of the human environment (40 CFR § 1501.7 and 1508.27).

Significant issues form the basis for alternatives—other reasonable courses of action (40 CFR 1508.25(b)(2)) that could relieve the conflicts involved in a proposal (40 CFR 1508.9(3)(b)) or that offer ways to avoid or minimize its adverse effects (40 CFR 1500.2(e)).

The Council on Environmental Quality (CEQ) NEPA regulations require this delineation:

> *Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3), narrowing the discussion of these issues … to a brief presentation of why they will not have significant effect on the human environment or providing a reference to their coverage elsewhere* (40 CFR § 1501.7).

Issues related to the proposal were identified and differentiated using as a source the external comments summarized in Appendix A. The comment summary includes editorial notes explaining how some environmental concerns were found to be already effectively addressed by the original project design (impact would be avoided or limited). The notes also explain how certain other comments caused the Forest Service to refine the proposed action or add particular design features, conservation measures, or monitoring requirements, details of which are outlined in an earlier section, above. In this process, some *preliminary* issues were accounted as nonsignificant—that is, remedied by the refinements or additional design features provided, to head off potential conflicts (40 CFR 1501.2) or more clearly avoid any impacts that could significantly affect the quality of the human environment (40 CFR 1508.27).

Many comments in the Appendix A summary, irrespective of whether they define an issue (disagreement), point to components of the human environment (relevant concerns, conditions) that may be affected by the project. Such comments help determine the subject matter that must be discussed in the analysis of impacts—EA Part 3, including the identification of appropriate environmental factors (indicators, measures) that make the predicted changes understandable and comparable. See the editorial notes in Appendix A for details on how each comment was considered or applied to frame the environmental analysis.

After making refinements and additions to the proposed action and accounting some preliminary issues as nonsignificant, the Forest Service again reviewed external comments to identify any issues for which significance remained to be determined. Three remaining issues were identified, carefully examined, and determined to be nonsignificant. These three issues, and reasons why they were categorized as nonsignificant, are explained in the following section.

Nonsignificant Issues—Reasons

In the case of each of following issues, categorizing it as "nonsignificant" mainly implies that the issue does not form the basis for "other reasonable courses of action," or alternatives to the proposed action. "Nonsignificant" is not a negative connotation about the value of the issue; to the contrary, consideration of each of these issues has helped the Forest Service assure environmental quality in the affected human environment, as explained below.

- **External comments contain a point of disagreement that the Forest Service must cut trees greater than 12 inches in diameter at breast height (DBH) to achieve the fuel-hazard-reduction purpose. The commenters assert that commercial harvest is not required.**

Of the several comments defining this issue, most are technical in nature, involving the science of fuels management and fire behavior. The comments express concern that the commercial thinning component of the proposed action is not necessary to achieve the hazardous fuel reduction purpose and that it might even make the current fuel conditions worse. Additionally, some of the comments imply that the issue is based at least in part on values attached to forests with large trees—wildlife habitat, snags—and doubts about whether these would be protected under the proposed action.

The comments make technical arguments against cutting any trees larger than 12 inches DBH in the context of hazardous fuel reduction. This comment however, does not appear to consider an integral part of the purpose and need (objective of the project) which is to reduce the risk of intense fire behavior resulting from fuel accumulations of future bark beetle caused mortality. In order to address this purpose and need, some trees larger than 12 inches in diameter must be removed from areas where current densities pose a high risk of beetle outbreaks. Meeting this need complements hazardous fuel reduction work—that is, it is designed to protect most of the same values that are at risk (for example: the safe evacuation route from communities at risk), from a possible high-intensity wildfire, and to prevent the recurrence of fuel buildups from beetle-killed trees. Consequently, the issue is considered outside the scope of the proposed action, or out of context, because the recommended course of action would not address the stated purpose and need. The management of bark-beetle risk in this case is an integral part of the purpose that the Forest Service has chosen to consider. As previously noted, the decision to include bark-beetle risk reduction in the project purpose was a direct result of collaboration with participating interested parties at the project-development stage, and consideration of their relevant concerns. These concerns focused on current forest conditions in the area and how these conditions differed from the desired conditions.

Another aspect of this issue is the concern it represents for maintaining a forest with large trees. This concern is consistent with various forest policy goals applicable to the area, especially those focused on scenery management, wildlife values of stands structured with the characteristics of late or old stages of forest succession, and resiliency to wildfires. The original proposed action was designed to be consistent with these policies and to create or foster their indicated desired conditions. In other words, the proposed commercial low thinning was already designed to retain large trees and enhance their growth. To further address this concern the proposed action was refined and specific design features were added. Additional design features include commercial thinning prescriptions that will thin all size-classes up to 21 inches in diameter to advance stands toward open, uneven aged structure and composition similar to the historic stand types that are currently under-represented. Due to the lack of large and old trees, and current higher than historic numbers of trees in the small size classes, thinning would concentrate on thinning-from-below, removing mostly the small-diameter trees and retaining the larger diameter

trees. Horizontal hiding cover will be provided by retaining non-thinned patches of forest trees as necessary throughout the project area, with emphasis on relatively flat topography and around existing snags for their further protection. See EA Part 3, especially under "Snags and Woody Debris," "Forest Vegetation," "Wildlife," and "Scenery and Recreation."

- **Some commenters suggest that the proposed action may not maintain sufficient untreated patches for forest complexity, wildlife cover, and recruitment of future old-growth tree components.**

This issue is related to the first one, in that it involves resource values attached to forests with large trees, and concerns about maintaining or culturing such a forest. The issue also stands on its own, however, because it requests the avoidance of particular adverse environmental effects, and to maintain or enhance certain desired conditions, apart from any fuels-and-fire concerns expressed against cutting any trees larger than 12 inches DBH.

The proposed action was designed to conserve the environmental qualities of concern. The proposed action was designed to retain cover to meet Forest Plan Standards for big game summer range. Currently, total cover is 37%, exceeding the Forest Plan standard of 20%. Satisfactory cover is at 7%, less than the Forest Plan standard of 12%. Marginal cover is at 30%, exceeding the Forest Plan standard of 5%. With proposed treatments big game cover would be reduced to 34% (3 percent decrease), which is still above Forest Plan standards. Satisfactory cover would remain at 7 percent (no change). To further address this concern the retention of untreated patches of forest was added as a conservation measure to the proposed action to avoid or reduce the intensity of any adverse wildlife effects, and to ensure a variety of vegetation cover conditions within the post-treatment forest.

In summary, this issue was determined to be nonsignificant because it is remedied by the proposed action that adds assurance that the environmental qualities of concern are truly conserved. Environmental effects related to this issue are disclosed in EA Part 3: Environmental Impacts of the Proposed Action and Alternatives, under the topics "Forest Vegetation" and "Wildlife."

- **One commenter suggested that the proposed action might be ineffective at reducing potential fire intensity, due to cut fuels being added to the site.**

Upon review and consideration of the original design, refinements, and added design features, the Forest Service concluded that "activity fuels" (slash generated by noncommercial thinning or commercial logging) would not contribute adversely to forest fire hazards, because these fuels are effectively reduced or removed through a combination of treatments including hand-piling and burning, whole-tree logging (removal of unsevered tops to log landings, where they are cut, piled, and burned), machine-piling and burning, prescribed underburning, or permitted salvage. Several similar treatments have been completed on areas on the Prairie City and the Malheur National Forest. One example, the Awake Project, included combinations of commercial thinning, pre-commercial thinning and underburning completed in 2000. In 2002, the Monument Fire moved from untreated areas into the Awake project area. The treated areas were used as a location to contain the fire spread using tactics such as back-burning and direct fire line. Firefighters were successful containing the fire in these treated areas due to lower fire intensity than that experienced in the un-treated areas. Primarily the lack of crown fire in the treated areas reduced spotting and thus fire spread. From visual inspections, mortality in the

forest vegetation in the treated areas was generally much less due to less scorch height on the larger trees and reduced duff from previous underburning.

In summary, this issue was determined to be nonsignificant because it is remedied through project design. Environmental effects related to this issue are disclosed in EA Part 3: Environmental Impacts of the Proposed Action and Alternatives, under the topics "Forest Fire Hazards" and "Forest Vegetation."

Alternative Formulation

Normally, issues identified during scoping are used to generate alternatives. However, because this project is being prepared under the Healthy Forest Restoration Act (HFRA) authorities, and the proposed action implements the recommendations of the Community Wildfire Protection Plan, no alternatives to the proposed action are required [HR 1904, Section 104(d)(3)]. Instead, the Interdisciplinary Team (IDT) considered all of the issues proposed during scoping and where feasible adjusted the original proposed action to resolve those issues the agency considered significant. In some cases this was handled by adding mitigation to the project and in other case the design of the project was modified.

Alternatives Considered and Eliminated From Detailed Study

The Oregon Natural Resources Council, in the context of their comments concerning the Healthy Forest Restoration Act and its authority related to the project, suggested this alternative, as follows:

> *"ONRC hereby suggests that the agency consider an alternative for this project that does not rely on commercial harvest to reduce fuels within the project area."*

This alternative was considered and eliminated from detailed study for reasons summarized below.

No Commercial Harvest Alternative

This alternative would consist of all proposed treatments except for the commercial thinning component included in some treatment combinations, in some stands. The Forest Service carefully reviewed this suggested alternative and considered whether it was another reasonable course of action, to meet the purpose and need of the project.

The Forest Service determined that the alternative would not be studied in detail because it would not respond to the project purpose and indicated forest-management needs—needs that were identified in collaboration with partners to the Grant County Community Fire Protection Plan and with other interested parties who participated in the project-planning session—as explained in more detail, below.

Concerning the treatments included in the alternative, the Forest Service recognizes that noncommercial cutting and underburning alone could reduce *surface* and *lower-canopy* fuel hazards in the project area; yet to reduce upper-canopy density and *crown-fire potential* to a level at which the area is likely safe for effective firefighting and public evacuation in the event of a large wildfire, some commercial cutting must be added to these treatments, in certain stands. Thus, targeted commercial thinning is an essential design criterion of the project, if it is to cause the changes in potential wildfire behavior expected at this location by partners to the Grant County Community Fire Protection Plan.

Additionally, the suggested alternative does not respond at all to current conditions posing a bark-beetle risk, the management of which is an integral part of the purpose. Bark-beetle risk directly threatens public resource values of the area specifically targeted for conservation by the Forest Plan, including scenery, timber, and wildlife; and it may cause fuel buildups to recur. As with crown-fire potential, those stand conditions reflecting a high risk of bark beetle outbreaks cannot be substantially improved without reducing stand densities to some degree through commercial thinning.

Finally, the alternative would not help meet the economic needs of local communities, which would benefit from the forest products generated by the currently needed commercial thinning.

Alternatives Studied in Detail

Whereas scoping did not identify any significant issues that would form the basis for an alternative to the proposed action, and whereas the alternative "No Commercial Harvest" was considered and eliminated from detailed study because it would not meet the purpose and need of the project, the scope of the environmental analysis consists of two alternatives that are studied in detail and compared for their environmental impacts: No Action, and Proposed Action (Revised).

Alternative 1 - No Action

Study of this legally required alternative indicates changes that would occur in the human environment if the project did not take place. The effects of "no action" establish a point of reference for the analysis, against which the proposed action can be measured and compared for its environmental impacts—whether beneficial, benign, or adverse.

Alternative 2 - Proposed Action (Revised)

(The full text, table, and figure describing the revised proposed action was presented in an earlier section of this EA Part 2.)

Components of the Human Environment That May Be Affected

At the conclusion of the scoping process, the district ranger directed the interdisciplinary team to focus on and describe impacts of the alternatives to particular components of the human environment that may be affected, in order to inform the decision to be made. These components and a full summary of the analysis of potential impacts are presented in Part 3.

Part 3: Environmental Impacts of the Proposed Action and Alternatives

This part describes the predicted changes in the human environment—those that would occur without action (Alternative 1) and those that the proposed action (Alternative 2) would produce. A condensed impacts assessment is provided by Table 2.

In narratives following the table, impacts of the two alternatives are discussed together, in a more-detailed comparative description that contrasts the expected future condition if no action is taken with predicted effects of the proposed action. The narrative discussions, like the table, are organized by components of the human environment that may be affected. Within each component, the focus is on the relevant concerns, conditions, and environmental factors identified through scoping, both internal and external. Integrated design features, conservation

measures, and monitoring requirements pertaining to each component are presented directly in front of each effects discussion, so that they can be considered in direct conjunction with those particular effects. Direct and indirect effects are described, followed by cumulative-impact discussions.

Cumulative impacts are those impacts that result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions (40 CFR § 1508.7). These "related actions" may be influencing current conditions. If so, their current (or foreseeable) effects are relevant to considerations of whether the proposed action would add to their effects. In the descriptions of cumulative impacts of the proposed action, relevant related actions that are known are identified and discussed. (A full listing of relevant related actions is provided in Appendix C.) Each cumulative effects analysis, for each environmental component, is guided by and is consistent with the Council on Environmental Quality letter, "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis" of June 24, 2005.

Each effects narrative concludes by addressing the consistency of the proposed action with applicable standards and the significance of its impacts. References to more detailed information or analyses are also provided, including references to resource specialist reports that are available in the project record The following specialist reports are incorporated by reference and found in the project record (40 CFR 1502.21) and are available for review at the Prairie City Ranger District in Prairie City, OR during normal business hours:

- Terrestrial Wildlife Report- prepared by Oechsner, Bush, and Schuetz, (June, 2006)
- Biological Evaluation/Assessment of Threatened, Endangered, Proposed, and Sensitive Wildlife Species – prepared by Oechsner, Sutcliffe, and Schuetz (April, 2006)
- Range Resource/Noxious Weeds Specialist Report – prepared by Julie Laufmann and Ted McArthur (April, 2006)
- Biological Assessment/Biological Evaluation Fisheries Report – prepared by Tiffany Vanosdall (March, 2006)
- Scenery and Recreation Report – prepared by Bonnett, Winegar, and Larson (March, 2006)
- Botany Report for Threatened, Endangered, and Sensitive Plant Species – prepared by Julie Laufman (May, 2005)
- Silviculture Report – prepared by Larry Amell (March, 2006)
- Soils and Hydrology Report – prepared by Carol Thornton and Jim Soupir (April, 2006)
- Forest Fire Hazards, Fuels, and Air Quality Report – prepared by Roy Walker (April, 2006)
- Economics Report – prepared by Glen Powell and Charlotte McCumber (April, 2006)
- Cultural and Heritage Report – prepared by Mary Robertson (2005)

Table 2. Summary comparing effects of the alternatives on components of the human environment (see narrative sections following table for more detail)

Physical Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
Forest Fire Hazards		
Fire-regime fuel condition-class	Remains highly departed (Class 3) from desirable historic characteristics (Class 1) on at least 87% of the area … Continuing high hazard for uncharacteristically intense wildfire and high risk of loss or severe impact to public values of the area, if a wildfire occurred	Condition-class improves to Class 2 on 1,778 acres (86%) of the 2,060 acres currently most highly departed from the desirable historic condition … Improvement means these areas become moderately departed from the desirable historic condition, with a moderate (reduced) risk of loss or severe impact to public values of the area, if a wildfire occurred
Potential wildfire intensity	Remains high to very high throughout nearly all of the project area	Overall potential fire intensity is appreciably reduced … Many individual stands reflect lower potential fire intensity … Those in high or very high-intensity categories are intermixed with lower-intensity areas
Potential wildfire type	Passive or active crown fire with some long-range spotting	Primarily surface fire with some passive crown fire
Potential wildfire average flame-length	6.0 feet	7.3 feet (increase is associated with potential surface fire, as opposed to crown fire)
Use of 16 Road corridor for ground-based direct-attack of potential wildfire and as a fire-evacuation route from at-risk communities	Likely not safe or effective, due to very high potential fire intensity (flame length, crowning, radiant heat)	Likely safe and effective, due to less crown-fire potential and thus lower overall intensity
Air Quality		
Smoke from planned fuel burning	No effect	Smoke would likely be forced toward Unity, 22 air miles to the northeast, but appreciable adverse effects are not likely under planned and approved burning conditions, as smoke would be diluted. If burning were conducted under west or northwest winds, air-quality impacts on any communities would essentially be avoided.
Smoke from a possible large wildfire in the area	Large wildfire is possible but not likely in the short term … PM10 and PM2.5 emissions would exceed unhealthy levels per Oregon standards	Large wildfire is possible but not likely in the short term … PM10 and PM2.5 emissions would be reduced by about half, compared to 'no action.'

Physical Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
Soil & Water		
Soil properties	Additions to currently existing minor impacts of compaction, displacement, erosion, and excessive heating would be directly avoided … There would be no appreciable source of these problems	Soil compaction and excessive heating increases at log landings, but not likely in other areas, due to required design features and conservation measures including winter-only logging, among others ... Percentage of whole project area reflecting detrimental soil conditions increases about one percent overall … No individual treatment units exceed the MNF standard (limit) of 20% detrimental conditions
Water quality and stream-channel stability	No appreciable change expected … Current conditions and beneficial uses maintained	Likely no measurable impact to water quality, as no appreciable soil erosion is expected … No destabilization of stream-channel beds or banks, as no in-stream activities are proposed and no appreciable water-flow changes are predicted … Current conditions and beneficial uses maintained
Soil properties in the event of a large wildfire	Decrease in soil-infiltration capacity, causing increased overland water flow and surface erosion … Decrease in recycling of nutrients and overall soil productivity	Reduced potential for soil erosion as an indirect effect of wildfire, due to substantially reduced potential fire intensity
Water quality and stream-channel stability in the event of a large wildfire	Short-term (2-5 years) measurable increase in stream sedimentation from soil erosion	Reduced potential for stream sedimentation as an indirect effect of wildfire, due to substantially reduced potential fire intensity
Snags & Woody Debris		
Average snags per acre, 10" in diameter at breast height or larger, 2015	4.75	4.66
Average snags per acre, 20" in diameter at breast height or larger, 2015	0.89	0.94
Coarse woody debris as desired under Forest Plan	Likely bark-beetle activity would substantially increase woody debris in the large size-classes, near-to-long term	Desired concentrations of large-diameter woody debris would be met in the mid-to-long term by virtue of design features and conservation measures; and through recruitment of new snags that will be created by some large trees being inadvertently killed by prescribed fire, which trees in turn will fall and become large woody debris

Biological Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	Alt. 2—Proposed Action
Forest Vegetation		
Presence of large trees in relation to forest policy goals	Tree diameter growth in dense stands continues to decline, keeping large trees under-represented in near future	Immediate change to higher proportion of large trees, as many smaller, lower-level trees are removed or killed by treatments … Growth of retained large trees accelerates … Candidate stands advance more quickly toward late or old structure conditions
Variety of other tree size-classes and cover conditions in relation to forest policy goals	Current variety persists in short term, changing slowly over time until disturbed by natural agents … Area remains overbalanced toward dense, closed-canopy, immature forests	Proportion of dense, closed-canopy forest is immediately reduced and proportion of less dense, open-canopy stands is immediately increased … Variety of vertical stand structures is still present, but overall balance changes toward larger-diameter, upper-level trees
Tree species compositions and stocking levels	Quaking aspen patches currently in decline continue to be grazed, browsed, and overtopped by competing conifers … possibly some small patches disappear over time. Grand fir composition—currently above historic levels in many stands—continues to increase and contribute to higher total stand densities.	Proportion of ponderosa pine, western larch, and quaking aspen increases … Proportion of Douglas-fir and grand fir decreases … Variety remains in tree species within or between stands, in horizontal density, and in tree canopy coverage, by virtue of design features or conservation measures to protect riparian vegetation, enhance aspen patches, retain wildlife travel corridors and hiding cover, and maintain scenic quality
Native shrubs, forbs, and grasses	Plant presence and development remains essentially stable in short term and gradually declines over time from shade and competition, until bark beetles or fire reduce upper-level tree canopy	Plant presence and development temporarily decreases in burn areas, then increases in short- to mid-term in all treated areas, from more available nutrients and sunlight
Bark-beetle risk	Most stands in project area continue to be at risk … Beetle activity certainly increases in near future	Serious beetle outbreaks become far less likely for about 20 years in about 60% of the current high-risk area. Risk is reduced to lesser degrees in other stands that are thinned less intensively or only underburned to conserve wildlife habitat components.
Resiliency to severe impacts, in the event of a large wildfire	Stands currently approaching late or old structure with large trees likely are transformed back to a stand-initiation stage—with low stocking of surviving large trees or vertical layers of vegetation—due to high-intensity crown-fire behavior.	Resiliency improves … Future wildfires likely cause effects of mixed severity, including survival of many large trees and some forest patches or vertical layers

Biological Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	Alt. 2—Proposed Action
Wildlife		
Diversity of habitats	In the absence of fire, current habitat diversity declines over several decades, as grand fir composition increases and quaking aspen declines	Provides long-term habitat diversity by increasing proportion species typical of early stages of forest succession (ponderosa pine, western larch, quaking aspen) and reducing proportion of forest stands currently trending toward domination by grand fir
Habitat qualities of late or old stages of forest succession	Some stands could attain desired late or old structure (LOS) in about 25 years, but this outcome may be diminished by bark-beetle activity (likely) or severe fire effects (possible).	Desired LOS conditions very likely attained in candidate stands in mid-to-long term (15 or more years) … Current and long-term connectivity between these stands is provided by modifying treatments in connection corridors in Units 8, 9, 10, 23 and 25
Habitat effectiveness index (HEI) for elk summer range in Crane Creek subwatershed, 2015	HEI = 0.54, compared to forest standard (minimum) of 0.40 … When indirect, beneficial effects of closing roads under the Phoenix project are considered, predicted HEI = 0.65	HEI = 0.52, compared to forest standard (minimum) of 0.40 … When indirect, beneficial effects of closing roads under the Phoenix project are considered, predicted HEI = 0.64
Lynx habitat in the Glacier Lynx Analysis Unit (LAU)	No change in quality of 80 acres of existing “unsuitable” habitat	Partial removal of dense horizontal cover by thinning or underburning 32 of 80 acres of presently unsuitable, unoccupied habitat is slightly negative short-term direct and cumulative effect … Retention of woody debris to forest standards and expected shrub response from burning are slightly positive longer-term direct and cumulative effects
Wildlife disturbance or displacement	No change from current condition	Degrees of temporary disturbance and displacement are likely during logging, noncommercial thinning, machine work, burning … depending upon season and tolerance of particular species or individuals
Threatened or endangered species or habitats	Threatened: “No effect” to lynx or bald eagle Endangered: “No effect” to gray wolf	Threatened: “May affect, not likely to adversely affect” lynx; “No effect” to bald eagle Endangered: “No effect” to gray wolf
Region 6 (R6) sensitive species or habitats	“No impact” to ten listed species, due to no habitat in project area and no known occurrence of species in or near project area	“No impact” to ten listed species, due to no habitat in project area and no known occurrence of species in or near project area

Biological Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
*MNF management indicator species (MIS) or habitats, including priority landbirds**	"Slightly positive" effect to habitat of pileated wood-pecker, pine marten "Neutral" effect to habitat of elk, three-toed woodpecker, black-backed woodpecker, white-headed wood-pecker*, Lewis' woodpecker*, hairy woodpecker, northern flicker* "Slightly negative" effect to habitat of red-naped sap-sucker* Williamson's sapsucker*, downy woodpecker "No change" to population trend of any MIS	"Positive" effect to habitat of Lewis' woodpecker* "Slightly positive" effect to habitat of white-headed wood-pecker*, red-naped sap-sucker*, Williamson's sapsucker*, downy woodpecker, hairy woodpecker, northern flicker* three-toed woodpecker, black-backed woodpecker "Neutral" effect to habitat of elk "Slightly negative" effect to habitat of pileated wood-pecker, pine marten "No change" to population trend of any MIS
MNF featured species, big game, raptors or habitats	"Neutral" effect to habitat of blue grouse, mule deer, red-tailed hawk, American kestrel, Cooper's hawk, sharp-shinned hawk, great gray owl, great horned owl, northern saw-whet owl, northern pigmy owl "Slightly positive" effect to habitat of northern goshawk "No change" to population trend of any of these species	"Slightly positive" effect to habitat of great gray owl, great horned owl, northern saw-whet owl, northern pigmy owl "Neutral" effect to habitat of blue grouse, mule deer, red-tailed hawk, American kestrel, Cooper's hawk, sharp-shinned hawk "Slightly negative" effect to habitat of northern goshawk "No change" to population trend of any of these species
Additional priority landbirds or habitats	"Neutral" effect to habitat of flammulated owl, chipping sparrow, Townsend's warbler, varied thrush, MacGillivary's warbler, olive-sided flycatcher, red-eyed vireo, veery, willow flycatcher "No change" to population trend of any of these species	"Slightly positive" effect to habitat of flammulated owl, chipping sparrow "Neutral" effect to habitat of Townsend's warbler, varied thrush, MacGillivary's warbler, olive-sided flycatcher, red-eyed vireo, veery, willow flycatcher "No change" to population trend of any of these species
Fisheries & Amphibians		
Stream or streamside habitat-quality factors (stream sediment, large woody debris, temperature and shade, water yield, wet or flooded areas and closely connected riparian habitat)	No adverse changes to trout habitat would occur in the form of sedimentation, loss of large woody debris, loss of shade, water-temperature increases, or water-yield increases, as there would be no appreciable source of these problems. Current quality of amphibian habitat in wet or flooded areas and closely connected riparian areas would be maintained.	Very unlikely to cause direct adverse effects to trout, and at most only minor (indeterminable, inconsequential) indirect adverse effects to trout habitat from any sedimentation, loss of large woody debris, loss of shade, water-temperature increases, or water-yield increases, by virtue of required design features and conservation measures. Prescribed burns that may partially affect riparian areas will retain beneficial duff or other ground cover to meet forest standards.

Biological Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
Stream or streamside habitat-quality factors in the event of a large wildfire	Likely short-term impacts to trout habitat include increased sediment transport to streams, sediment effects on channel qualities and spawning habitat, ashflow, loss of streamside shade in turn causing higher summer water temperatures (a particular concern for bull trout), increased water yield elevating nutrient and sediment loads, and loss of large woody debris. Spring seeps, meadows, marshes, ponds, streams and associated wet-site low vegetation would likely only be minimally and temporarily affected.	Appreciably reduces the risk of secondary, short-term fire impacts to trout habitat that could occur if no action is taken, as potential fire intensity and resistance to control is appreciably reduced, meaning less risk of severe impacts to forest vegetation, soil, and water
*Threatened and R6 sensitive species or habitats, including MNF management indicator species**	Threatened: "No effect" to bull trout*, absent a large wildfire Sensitive: "No impact" to interior redband trout* and Columbia spotted frog, absent a large wildfire	Threatened: "May affect, not likely to adversely affect" bull trout* or its habitat in Crane Creek Sensitive: "May impact individuals or habitats of interior redband trout* or Columbia spotted frog, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population(s) or species"
Noxious Weeds (Invasive Plants)		
Current weed infestations	The relatively small populations of weeds (less than one acre total) in the area are not likely to increase appreciably, due to continuing monitoring and control	The potential for increase is limited, The winter-logging requirement along with other design features will limit disturbance
Potential for new weed establishment	Current hunting, grazing, and wood cutting imply limited potential to spread weeds, due to low level of disturbance and ongoing monitoring and control … Possible large wildfire could expose mineral soil and create favorable conditions for widespread weed establishment in short or near term, due to potential fire intensity	Equipment and burning cause limited new disturbance representing potential new weed-establishment areas … The potential is limited, however, because there are no known weed infestations near possible disturbance areas, the winter-logging requirement will limit disturbance, and the other weed-prevention and control measures prescribed in the design features are likely to be effective. … Risk of fire creating favorable weed habitat over large areas is reduced, due to reduction of potential wildfire intensity

Biological Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
Weed monitoring & control	Prairie City Ranger District weed monitoring and control program continues	Post-operations, disturbed areas are surveyed annually for 3 to 5 years, to allow early weed detection and treatment
Sensitive Plants		
Mechanized disturbance	Changes to sensitive-plant habitats, individual plants, or plant communities are very unlikely, because there are no appreciable sources of mechanized disturbance	Changes to sensitive-plant habitats, individual plants, or plant communities are possible but not likely … Integrated design features, conservation measures, and monitoring requirements effectively remove mechanized disturbances from, or restrict them within, any potential habitats or plant occurrences
Prescribed fire	Changes to sensitive-plant habitats, individual plants, or plant communities are directly avoided, because prescribed fire is absent	Changes to sensitive-plant habitats, individual plants, or plant communities are possible from fire that may be allowed to creep at low intensity back into riparian areas … Above-ground parts of northern twayblade, moonwarts, or sedges could be injured if present, short-term … Habitat of some species would benefit
R6 sensitive plant species that may occur in project area, based on presence of suitable habitat	"No impact" to Henderson's ricegrass, Wallowa ricegrass, upswept moonwort, mountain moonwort, dainty moonwort, triangle moonwort, Mingan moonwort, northwestern moonwort, dwarf suncup, Back's sedge, inland sedge, Parry's sedge, northern twayblade, Raven's desert parsley, colonial luina, Bridge's cliff-brake, and least phacelia "May impact clustered lady slipper individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population(s) or species"	"No impact" to Henderson's ricegrass, Wallowa ricegrass, dwarf suncup, inland sedge, Raven's desert parsley, colonial luina, Bridge's cliff-brake "May impact upswept moonwort, mountain moonwort, dainty moonwort, triangle moonwort, Mingan moonwort, northwestern moonwort, Back's sedge, Parry's sedge, northern twayblade individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population(s) or species" "Beneficial impact" to clustered lady slipper and least phacelia

Economic and Social Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	Alt. 2—Proposed Action
Livestock Grazing		
Forested range condition	Few if any changes in short term … Current good production likely declines in long term, due to increasing forest density and competition for light and nutrients	Prescribed burning consumes some current forage except in no-burn areas (most riparian areas and protection-areas for wildlife cover, scenic quality or cultural properties) … Full or increased forage production returns in short term, from rapid vegetation- response to thinning and burning
Forage availability	Few if any changes in short term … Less availability in long term due to declining production	Forage availability is reduced for less than one year … Availability likely improves in near term, from forage-production response
Distribution of livestock	Few if any changes in short term … Less distribution in long term from poorer range condition and forage availability	Livestock distribution may be managed or adjusted in the short term consistent with policies, plans and permits that apply … Distribution and forage utilization likely improves in near term
Effects on range improvements	Few if any changes in short term … Falling dead trees and limbs may increasingly damage improvements in longer term	Improvements are protected or repaired if damaged, as a stipulation of contracts governing project operations
Permittee access for management	Few if any changes in short term … Increasing buildup of dead trees and limbs on ground may reduce access in longer term	Access is maintained
Forest Products Economy		
Timber supplied to area forest products industry	None	Approximately 2.9 million board feet would likely be purchased by local-area logging contractors or forest products manufacturers
Timber-related jobs sustained in area economy for one year	None	Approximately 24.7 jobs are sustained in local-area timber and forest products industry and connected economic sectors for one year, provided timber is processed in area facilities (likely)
Total income generated	None	Current dollar equivalent of approximately $725,000 in 1998

Economic and Social Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
Scenery & Recreation		
Predominance of large trees in the Glacier Loop scenic motorized travel corridor	Little change to current views of moderately dense forest with mixed size-classes of trees, until disturbed by bark-beetles or wildfire … In relation to desired conditions under Forest Plan, this result does not adequately draw attention to, or provide for further development of, large trees	Appearance of the forest immediately changes, due to removal of many small and medium-size trees and generally lower density … Higher proportion of large trees (favored for retention in all areas) is immediately apparent … Likelihood is increased that all desired conditions for visual corridor under Forest Plan are achieved in the long term
Foreground visual diversity in the Glacier Loop scenic motorized travel corridor	Little change to current views of moderately dense forest with mixed size-classes of trees, until disturbed by bark-beetles or wildfire … As one traveled through the corridor, one would not see much diversity in vegetation patterns or densities, or variable depths of view into the forest	Causes variation from one stand or patch to the next … Retains a variety of vertical stand structures including both even-age and uneven-age conditions … As one traveled through the corridor, he or she would notice more variety of vegetation patterns and densities, intermixed with deeper views into the forest … "Partial retention" standard applicable to foreground areas would be met
Opportunities for dispersed recreation including camping at undeveloped sites or hunting	Little change to current dispersed recreation opportunities … Camping and hunting could continue in "roaded-natural" setting … Eventual bug-kill would add woody debris to forest floor, affecting foot travel	During logging or burning operations (at intervals, over next several years), some recreationists might be displaced temporarily to other areas … General recreation in the area likely would continue except where Forest Service applies actual temporary restrictions for public safety … Area would continue to provide "roaded-natural" conditions
Opportunities for winter snowmobile recreation on designated routes	No change to current opportunities … Snowmobiling would continue on designated routes, including Forest Road 16 itself and other connected roads on or near the project perimeter	During winter logging operations (probably involving one winter season, most likely 2006-2007), designated snowmobile routes in the area would be closed … One or more alternate routes will be designated to substitute for this temporary loss of routes
Cultural or Historical Resources		
National Register of Historic Places (NRHP)-eligible and potentially eligible prehistoric archaeological sites	No appreciable change predicted for foreseeable future, absent an intense wildfire … A possible high-intensity fire could damage prehistoric "lithic scatters"	No changes predicted to any known prehistoric properties from logging or underburning, because sites would be protected by separating them from treatment areas … Risk of severe wildfire impacts to prehistoric sites is reduced, due to lower potential fire intensity

Economic and Social Components & Environmental Factors	Predicted Effects of the Alternatives	
	Alt. 1—No Action	**Alt. 2—Proposed Action**
NRHP-eligible and potentially eligible historic archaeological sites	No appreciable change predicted for foreseeable future, absent an intense wildfire … A possible high-intensity fire could damage or destroy historic structural ruins, carvings on trees, wood troughs, or other elements	No changes predicted to any known historic properties from logging or underburning, because sites would be protected by separating them from treatment areas … Risk of severe wildfire impacts to historic sites is reduced, due to lower potential fire intensity
Native plants or plant habitats of potential contemporary interest to American Indians for traditional uses	No appreciable change predicted for foreseeable future, absent an intense wildfire … A possible high-intensity fire would alter plant communities, probably more so than historical mixed-severity surface fires, including burns caused by American Indians	Habitat of plant communities traditionally important to regional tribes of American Indians may benefit, because forest and fuel conditions change to more closely resemble historic patterns or range of variability, implying less-intense future wildfires and consequently less-severe potential impacts to native plant communities and their physical growing-sites

Integrated Design Features, Conservation Measures, and Monitoring Requirements

Impacts on components of the human environment were analyzed with consideration of design features or conservation measures that are built into the proposed action to ensure consistency with applicable standards. In the same way, the analysis considered any special monitoring requirements that have been prescribed to avoid, reduce, or control potential adverse effects the proposed action.

Integrated Features Involving Roads—General to All Components of the Human Environment

Concerning roads or other infrastructure, the proposed action includes the following elements:

- The project would not involve any construction of new permanent roads or other new permanent infrastructure.
- The project would not involve any changes to current access management unless required to meet particular resource management standards.
- Existing roads used for proposed treatments would have any current drainage problems repaired and would be brought up to normal maintenance standards prior to log hauling.
- If any temporary roads are developed for access of workers or equipment, they would be located outside of riparian habitat conservation areas (RHCAs)—areas near streams or other water—and rehabilitated and closed upon completion of treatments for which they are used.
- If any existing roads in the area that are currently grown over or closed by earth berms are used for firelines or temporary access of workers or equipment, they would be rehabilitated and closed again upon completion of treatments for which they are used.
- Road rehabilitation may involve a combination of treatments that could include reshaping, "subsoiling," planting, seeding, or placing woody debris on the rehabilitated surface to help stabilize soil and discourage unauthorized use.
- Use of any developed water sources for road maintenance work would conform to all applicable standards or Best Management Practices.
- The gravel source for road maintenance work would conform to all applicable standards or Best Management Practices.

Integrated Features Specific to Certain Components of the Human Environment

The proposed action involves many other design features and conservation measures to ensure consistency with applicable standards, or monitoring requirements to avoid, reduce, or control potential adverse effects; these built-in features are presented in the context of the particular environmental components or natural resources to which they pertain, as follows.

Physical Components of the Human Environment

Physical components of human environment that may be affected include forest fire hazards, air quality, soil, water, snags, and woody debris. Impacts to each of these are discussed in individual sections below.

Forest Fire Hazards

The primary environmental concern regarding forest fire hazards is the **risk of uncharacteristically intense fire behavior** that could result in severe impacts to private property or publicly owned facilities and natural resources in or near the project area. Public values at risk are detailed in the "Current Conditions" section of Part 1.

Fuels and Fire Design Features, Conservation Measures, and Monitoring Requirements

The proposed action is, by its purpose and nature, designed to change—toward the desired conditions described in Part 1—current fuel conditions, potential fire behavior, and the risk of severe fire impacts. Each treatment described in Part 2 is proposed to serve this purpose and is designed to meet particular fuels-and-fire needs, in conjunction with bark-beetle risk reduction. The proposed action also involves the following fuels-and-fire special features:

- Firelines needed to conduct the proposed treatments shall consist of natural breaks, existing roads, or hand-constructed lines. Hand-constructed firelines may be used to keep fire out of sensitive areas such as historic sites or private property.
- Private property will be avoided and protected from prescribed fire by isolating or separating it from areas to be treated. This may be accomplished by constructing firelines, planning ignitions to stop at effective control points such as roads or natural barriers, staging firefighters or firefighting equipment at strategic points, or other means.
- The Forest Service will take steps to notify adjacent landowners in advance of planned burn operations.
- In the event of fire moving onto private property, aggressive fire suppression tactics will be used.
- A prescribed burning job hazard analysis has been developed that outlines known hazards and measures to avoid accidents involving the public. The extent to which these measures will be used is dependent upon the degree of exposure to the public. Measures may include but are not limited to the following:
    - Signs may be placed on affected roads to inform visitors to the area of a prescribed fire.
    - If roads must be closed during burn operations, they will be signed and notification of this action will be made through Malheur Dispatch.
    - The Forest Service will take steps to inform the general public through radio, newspapers or other means of planned burn operations and the need for the burning.
- As part of the plan for retention of logs and snags, protection measures shall be used during prescribed underburning to reduce consumption of these large woody fuels needed for wildlife habitat.

Other aspects of burn operations designed to conserve natural resources or reduce environmental effects are covered under the environmental components to which they pertain.

Effects of the Alternatives

Effects of the alternatives on wildfire potential are described by comparing changes in fire-regime condition-class, fire intensity, and fire type.

Direct & Indirect Effects

Fire-Regime Condition Class

If no action is taken, fuel conditions in the project area would remain highly departed from desirable historic characteristics on at least 95 percent of the area, meaning there would continue to be considerable woody fuel of mixed size-classes on the ground and relatively dense forest conditions at one or more vertical levels—making a "fuel ladder," with some differences between stands. In the near to long term, tree mortality from bark-beetle attacks would likely increase surface fuel loads by an appreciable degree and cause further departure from the desired condition. Under these conditions, the project area would continue to be at high hazard for uncharacteristically intense wildfire, which carries with it a high risk of loss or severe impact to public values of the area, if a fire occurred. The fire-regime condition class analysis was completed using the Forest Vegetation Simulator, modeling tools in INFORMS, and photo interpretation. Fire hazard determinations are based on monitoring completed on the Malheur National Forest, and extensive experience of fire personnel on the Prairie City Ranger District. The Fuels Planner on the Prairie City Ranger District has over 20 years of experience in fuel types similar to those in the 16 road project area.

By comparison, the proposed action would cause **surface fuel loads** to be closer to historic conditions—that is, consistently within the desired range of 5 to 10 tons per acre, after treatment. Larger size-classes of down woody fuels would make up the greater portion of total fuel tonnage but would be greatly reduced from current loads. Duff depths are expected to decrease by as much as 50 percent from burning. The resulting, near-term fuel conditions would comprise more grass, in particular, which can burn with high intensity but lower severity (less impact) than dead woody fuels. In the mid-to-long term (5-15 years), small trees and limbs killed by the underburning would begin to fall, and surface fuel loads would start to increase again, creating a possible management need for additional underburning.

The proposed action would also change **canopy fuel conditions** considerably, through the combined effects of thinning and underburning. In the short term, thinning and underburning would substantially raise the canopy base height (height to the base of the live forest canopy) and greatly reduce canopy bulk density (combined weight of tree crowns above an area). The residual stand would consist of a higher proportion of fire-dependant and -adapted tree species. Those stands receiving underburning only would also have a higher canopy base height, due to fire killing small-diameter trees that form the current fuel ladder and scorching lower limbs of the larger, residual live trees.

As an overall effect on fuel conditions, the proposed treatments would cause 1,778 acres (86 percent) of the 2,060 acres most highly departed (condition-class 3) from the historic condition (condition-class 1) to improve to condition-class 2. Condition-class 2 can be described as moderately departed from historic conditions, with a moderate (reduced) risk of loss to desired ecosystem components, which in this case include soil properties, developing late and old forest-structure conditions, wildlife and fish habitat, and scenery.

Fire Intensity and Fire Type

Potential fire intensity was computer-modeled (Fire and Fuels Extension of the INFORMS Model) assuming extreme fire weather—"97th percentile conditions" (comprising high temperatures, low relative humidity, and some surface wind). "97th percentile conditions" means that only three percent of wildfires in this area burn under more fire-conducive weather. These modeling assumptions were chosen in order to put the effectiveness of proposed treatments to a

tough test. In other words, we don't care too much about how fuel conditions affect potential fire behavior on days when weather itself would limit or prevent fire intensity, making a fire easy to control and suppress—rather, we're mostly interested in what would happen under difficult or extreme fire weather.

If no action is taken, potential fire intensity remains high to very high throughout nearly all of the project area, as shown in Figure 4. In the great majority of the area (95 percent) that is classified as fire regime 1, an uncharacteristic, very high intensity fire would be expected, with passive or active crown fires and long-range spotting. Fire intensity (flame length, crowning, and radiant heat) would well exceed capability for ground-based crews and equipment to use direct-attack firefighting methods. Under such conditions, the 16 Road corridor could probably not be safely or effectively used as desired—as a location to slow or stop the spread of a large fire moving through the area and as a fire-evacuation route from at-risk communities. Conditions would likely be unsafe for attempting to protect structures, placing them at high risk of loss. General fire severity (impacts) would be high with many trees in all size-classes being killed and with damage to soils and other natural resource values.

By comparison, the proposed action would cause overall potential fire intensity—the combined measure of flame length and crowning potential—to be appreciably reduced. As shown in Figure 5, many individual stands would reflect lower potential fire intensity compared to no action, and those that remain in the high or very high-intensity category would be broken up or intermixed with lower-intensity areas.

In the short term, **surface fire intensity** and rate of spread may increase measurably in some stands—those that receive the most canopy thinning, due to more fine, flashy fuels (cured grasses) and less cover to effectively reduce wind of any given speed. (The modeled grass response does not, however, include any allowance for reduction of grasses from appropriate grazing.) Fires occurring during extreme weather conditions would be primarily surface fires, however, as opposed to crown fires, as a result of the treatments. Consequently, direct attack by ground-based crews and equipment would be more effective in most of the project area compared to no action. General fire severity would be much lower, with less mortality in the residual stand, and reduced soil impacts.

In the midterm (year 2015) modeling various stands and stand treatments indicates most benefits of the proposed action still being present: improved fuel condition-class, with mixed results on flame lengths and surface-fire intensity, yet current crown-fire potential reduced to surface-fire behavior in most stands. Exceptions to this—where passive crown-fire potential returns by 2015—appear where the model anticipates abundant pine regeneration as a consequence of the currently proposed treatments. This indicates a possible future management need for maintenance burns in some stands, to control or reduce lower-level live canopy fuels.

Table 3 shows a comparison of overall fire-behavior characteristics for a hypothetical 97th percentile fire in the year 2015.

Table 3. Comparison of fire characteristics by alternative in year 2015

	No Action	Alternative 2
Acres of Passive or Active Crown Fire	1,762 acres	911 acres
Average Flame Length	6 ft.	7.3 ft.

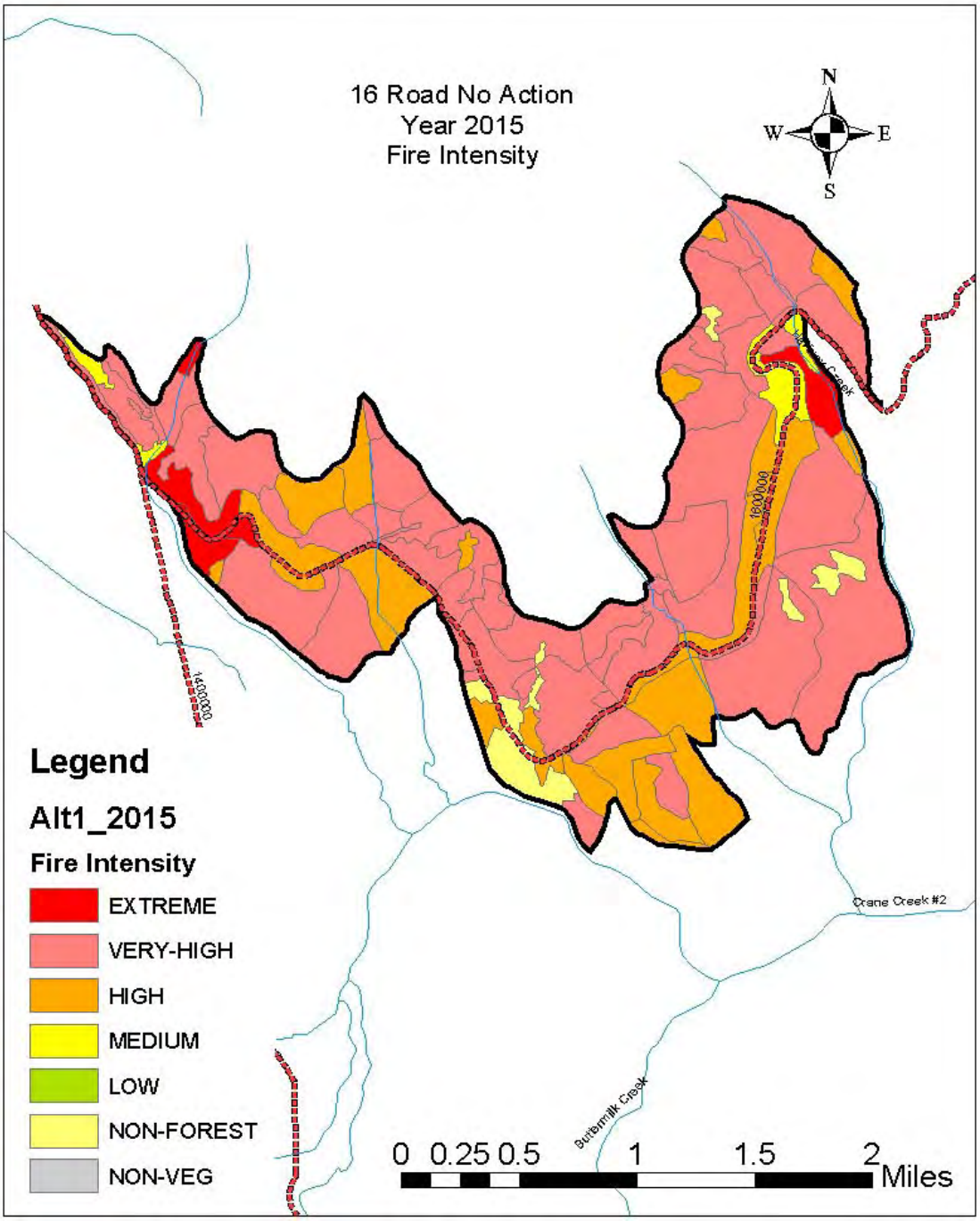


Figure 4. Potential fire intensities based on flame lengths and crowning potential for the no action alternative.

Potential fire intensity was calculated using existing stand exam and fuels photo series. Data was run through the Forest Vegetation Simulator (FVS) - Fire and Fuels Extension and INFORMS to model fire intensity. Potential fire intensities are calculated from torching and crowning indexes created in FVS using extreme weather days.

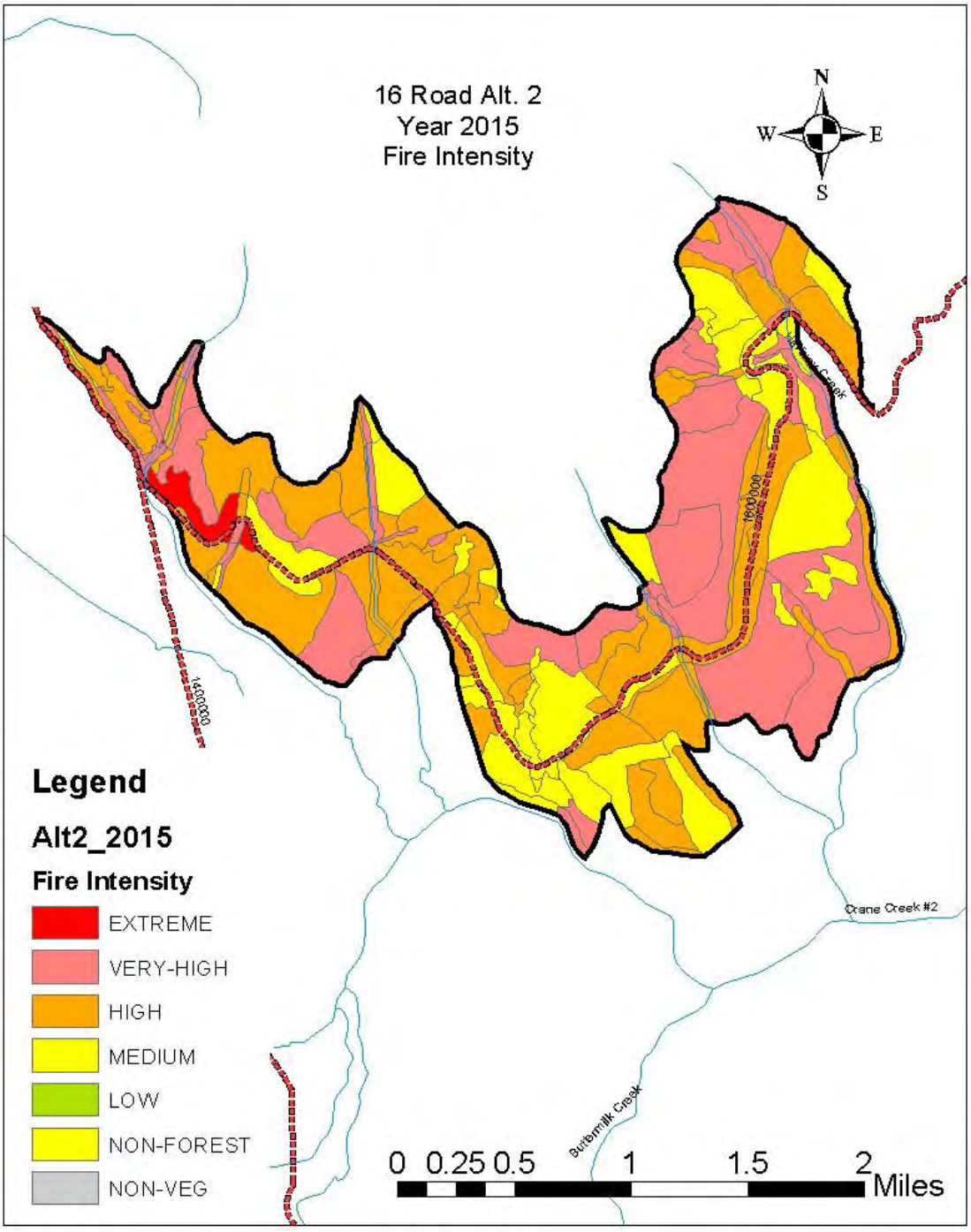


Figure 5. Potential fire intensities based on flame lengths and crowning potential for the proposed action alternative.

Potential fire intensity was calculated using existing stand exam and fuels photo series. Data was run through the Forest Vegetation Simulator (FVS) - Fire and Fuels Extension and INFORMS to model fire intensity. Potential fire intensities are calculated from torching and crowning indexes created in FVS using extreme weather days.

The proposed action (Alternative 2) reduces the area of potential crown fire by 851 acres by modifying the surface and canopy fuels. Average flame lengths, however, increase by more than one foot due to increased effective wind speed within more-open stands and the fact that more fine fuels (grasses) may be present. While increased surface-fire intensity (flame-length) under extreme fire-weather conditions is not desirable, the combination of these effects still suggests improved firefighting capability even under difficult circumstances, because the predicted increase is associated with potential surface fire, as opposed to crown fire. Thus, firefighters should be able to direct-attack such a fire from Forest Road 16 and more likely stop it at the road, as there would be much less chance of it crossing the road through the crowns of upper-level trees. Several similar treatments have been completed on areas on the Prairie City and the Malheur National Forest. One example, the Awake Project, included combinations of commercial thinning, pre-commercial thinning and underburning completed in 2000. In 2002, the Monument Fire moved from untreated areas into the Awake project area. The treated areas were used as a location to contain the fire spread using tactics such as back-burning and direct fire line. Firefighters were successful containing the fire in these treated areas due to lower fire intensity than that experienced in the un-treated areas. Primarily the lack of crown fire in the treated areas reduced spotting and thus fire spread. From visual inspections, mortality in the forest vegetation in the treated areas was generally much less due to less scorch height on the larger trees and reduced duff from previous underburning.

Correspondingly, public evacuation through the area is more likely to be safe under any given set of fire-weather conditions than under the same conditions without action. Additionally, the predicted change toward less crown-fire potential and thus lower overall intensity implies reduced fire severity (resource impacts). The favorable change in predicted overall fire intensity is depicted in Figure 5.

All proposed activities and their predicted effects are consistent with direction in the Forest Plan to manage fuel levels that will minimize the potential of high intensity, catastrophic wildfires and also result in a cost-effective protection program.

All proposed activities and their predicted effects are consistent with the direction in National Fire Plan to reduce the threat to life and property from catastrophic wildfire and restore natural ecological systems to minimize uncharacteristically intense fires.

All direct and indirect adverse effects of the proposed action on fuel hazards and potential fire behavior are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on forest fire hazards is the 29,388-acre Crane Creek subwatershed. This is the logical break for considering cumulative fuel conditions and potential fire behavior, because, in the event of a large fire starting in the project area, it is likely that the first primary ridge line separating Crane Creek from adjacent subwatersheds would be used to contain it. Related actions relevant to the analysis are the past, present, and reasonably foreseeable future actions noted and described in Appendix C.

Related past actions in the subwatershed were considered relevant if they occurred within the past 12 years, because 12 years is the average historic fire-return interval for the majority (80 percent) of the subwatershed. These past actions have included timber harvests, noncommercial thinning projects, reforestation, fuels treatments, and grazing. Additionally, the Sheep Fire of 1990 has influenced the current, cumulative condition: The fire and postfire management

returned much of the 4,781 acres involved to the stand-initiation stage of forest succession. As one consequence of these actions and events, there are many areas of natural or artificial regeneration, and these are currently condition class 2 or 3 due to high stocking levels and surface fuels. Past timber-harvest areas, however, were normally treated with machine- or hand-piling and burning of slash, or in some cases broadcast burning, which generally reduced fuel hazards and improved the condition-class, at least initially.

To consider cumulative effects of the proposed action, the Forest Service looked mainly at cumulative fuel conditions in that portion of the subwatershed classified as Fire Regime 1, as most of the project area is also classified as Fire Regime 1. Among these Fire Regime 1 areas (80 percent of the subwatershed), the current, cumulative fuel condition, including the influence of relevant past actions, is as follows: 0 percent is condition-class 1 (within the historic range of conditions), 14 percent is condition-class 2 (moderately departed from historic conditions), and 66 percent is condition-class 3 (highly departed from historic conditions). Thus, the overall picture is one of generally high fuel hazards throughout the subwatershed—an area where historically fires tended to be frequent, preventing such fuel buildups.

The proposed action would not make the cumulative fuel condition worse; rather, it would have a beneficial cumulative impact by improving fuel condition-classes throughout the project area—specifically, causing 1,778 acres of condition-class 3 fuels to improve to condition class 2. Similarly, the high-intensity potential fire behavior and high risk of severe fire effects associated condition class 3, currently representing the bulk of the subwatershed, would be reduced and improved by the proposed action (albeit slightly as the project area is only six percent of the subwatershed), as it would cause nearly half of the acres in the project area that currently have crown fire potential to instead support a surface fire with less-severe impacts, even under extreme fire weather. Maintaining these beneficial contributions of the proposed action in the mid-to-long term might require additional underburning to control surface fuel buildups and ingrowth of lower-level live canopy fuels.

Current and reasonably foreseeable future actions in the subwatershed related to the proposed action include other forest-health and fuels-management projects listed on the Malheur National Forest 5-year action plan, all of which would border Forest Service Road 16. If implemented, the effect of these projects would be to reduce hazardous fuels toward less departure from the historic fire regime, alter the mosaic of treated and untreated areas within the subwatershed, and provide a defensible corridor along Road 16 for firefighters. Additionally, continued grazing under current management plans would somewhat reduce fine fuels (cured grasses) and thereby reduce potential fire intensity over much of the project area and subwatershed. All of these related actions would cause beneficial changes to the current, cumulative fuel condition. The effect of proposed action on this condition would be to complement or add to these possible near-term benefits.

All predicted cumulative effects of the proposed action are consistent with fuels-and-fire-related standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

No adverse cumulative impacts of the proposed action on fuel hazards and potential fire behavior are predicted.

More Detailed Information or Analyses

Additional details about effects of the proposed action and the no-action alternative on wildfire potential can be found in "16 Road Forest Health Project—Forest Fire Hazards, Fuels, and Air Quality Report (Walker, 2006)," located in the project record.

Air Quality

The primary air-quality concern is smoke that would be generated from proposed fuel-burning treatments, and its potential to be an irritant or human health problem. Additionally, the nearby Strawberry Mountain Wilderness is a Class I airsheds. In Class I areas, only very small increments of new pollution above existing air pollution levels are allowed. Accordingly, the State of Oregon has designated visibility-protection periods for Class 1 airsheds from July 1st to September 15th for Central Oregon and the Cascades. Concerning Class 1 airsheds in Eastern Oregon, however, similar protection periods have not been set.

A secondary concern is smoke from a possible wildfire in the area, and the air-quality impacts from such a fire burning in the absence of the proposed treatments, compared to burning under post-treatment conditions.

Air Quality Design Features, Conservation Measures, and Monitoring Requirements

The proposed action involves the following air quality special features:

- In compliance with the Clean Air Act, burning of any kind will not occur unless prior approval is granted by Oregon Department of Forestry. The Clean Air Act sets air quality standards for particulate matter (PM) for particles less than 10 microns in diameter (PM10) and less than 2.5 microns in diameter (PM2.5—the main concern for human health). All amounts of PM10 and PM2.5 emissions will be calculated using the CONSUME software in the Fasttracks reporting system, which is also submitted with planned burn operations to the Oregon Department of Forestry to determine compliance with the Clean Air Act.
- Even though no visibility-protection periods have been set for wilderness Class 1 airsheds in Eastern Oregon, all burning will occur outside visibility-protection periods set for Central Oregon of July 1st to September 15th.
- Burning should be planned for times when transport winds are sufficient to displace much of the smoke from the area.

Effects of the Alternatives

Direct & Indirect Effects

If no action is taken, smoke generated from within the project area, with resultant effects on air quality, are much less likely during the corresponding period (through 2008). This is because, statistically, a large wildfire (100 acres or more) starting in, or burning through the area, is much less likely during this timeframe than is the proposed action. If, however, a large wildfire occurred in the area under extreme fire weather, the smoke produced would exceed PM10 and PM2.5 emission levels described as unhealthy in the State Implementation Plan of the Oregon Smoke Management Plan. Compared to the same wildfire burning under post-treatment conditions, daily smoke production and both PM10 and PM2.5 emissions would be roughly twice as high.

Concerning prescribed burning of the proposed action: smoke produced would likely be forced to the northeast, as prevailing winds are from the southwest. The town of Unity at 22 air miles to the northeast of the project area is the closest potentially affected community. Appreciable adverse effects at Unity are not likely from burning under planned and approved conditions, as smoke would be diluted. If burning can be conducted under west or northwest winds, air-quality impacts on any communities would essentially be avoided.

Smoke generated from slash-pile burning is most likely to only affect the immediate surrounding area, especially Crane Prairie, and mostly in the event of an air inversion. Inversions occur during clear, calm, settled weather when warm air lies above a cool-air surface layer. This condition traps smoke if it is present, resulting in poor visibility and hazy conditions. The Crane Prairie area has no year-round residents and any inversion-related smoke effects would be short-lived.

The proposed action and its predicted effects under planned controls are consistent with state and federal air quality regulations.

All direct and indirect adverse effects of the proposed action on air quality are considered nonsignificant as proposed.

Cumulative Impacts

The cumulative-impacts analysis area for air quality is the project area, expanded to include related actions in the same "airshed"—that is, near enough to the project area that smoke generated by the proposed action might combine with smoke generated concurrently by a related action, as though from a common source with potentially common effects. Related actions relevant to the analysis are the reasonably foreseeable future actions noted and described in Appendix C. These include currently planned underburning at the Crooked Creek project approximately 10 miles to the west or the Pine Creek project, which is approximately 18 miles to the northwest. These projects might be implemented during the same season(s) as 16 Road. For 16 Road to cause a cumulative air-quality impact, however, the burning would need to be somewhat upwind or downwind from the other projects (in line with prevailing air flows) and occur within a day or two of burning at these or other areas. Beyond two days, smoke dissipates enough to reduce the potential for appreciable, combined impacts. In the event that the 16 road project is implemented during the same season as either of these projects, all underburning will be scheduled and conducted to be in compliance with the Clean Air Act, as determined from calculated PM10 and PM2.5 emissions and burn plans submitted to Oregon Department of Forestry for advance approval.

Slash-pile burning at other sites, too, will likely occur during the same time period (seasons) as the pile burning planned for the 16 Road project. All pile burning will be scheduled and conducted to comply with the Clean Air Act, as determined from calculated PM10 and PM2.5 emissions and burn plans submitted to Oregon Department of Forestry for advance approval.

All predicted cumulative effects of the proposed action are consistent with state and federal air quality regulations.

All cumulative adverse impacts of the proposed action on air quality are considered nonsignificant as proposed.

More Detailed Information or Analyses

Additional details about effects of the proposed action and the no-action alternative on air quality can be found in "16 Road Forest Health Project—Forest Fire Hazards, Fuels, and Air Quality Report (Walker, 2006)," located in the project record.

Soil and Water

Important environmental concerns for soil and water resources of the area are the maintenance of soil properties beneficial for forest tree and plant production, mainly through avoidance or control of soil compaction, displacement, erosion, or excessive heating; and the maintenance of water quality for stream beneficial uses assigned by the State of Oregon, which in this area include irrigation and stock watering, freshwater habitat, bull trout habitat, spawning habitat, wildlife habitat, and human recreation. Water quality for these uses is conserved mainly through avoidance or control of sedimentation, water-temperature increases, or actions that could destabilize stream channel beds or banks.

Soil and Water Design Features, Conservation Measures, and Monitoring Requirements

The proposed action involves the following soil-and-water special features:

Design Features and Conservation Measures

- To minimize soil disturbance, skid trail and landing locations would be approved in advance by the Forest Service.
- Mechanized harvesters or ground-based skidding equipment would not be permitted on areas with sustained slopes steeper than 35 percent (about 20˚).
- Existing skid trails and landings would be used where feasible and approved.
- Skidding plans would avoid skidding down swales and draws, and where necessary and allowed, cross such features perpendicular to the draw bottom.
- On slopes greater than 20 percent, upon completion of harvest or other mechanized activities in individual treatment areas, skid trails or equipment trails would be treated for erosion control using "waterbars," seeding or other treatments deemed necessary by the contract administrator to promote soil stability. For skid trails lacking in cover after use, woody debris would be placed on skid trails before closing the units to reduce erosion and discourage future unauthorized use.
- Logging would take place in the winter when sufficient snow is present to prevent compaction or disturbance to the soil surface. With a winter logging agreement between the Forest Service and the contractor, specific acceptable conditions would be detailed.
- Where fuels are to be machine-piled, piling would occur using equipment with a grapple and boom when soils are dry, frozen, or snow-covered. Equipment will walk on slash during operations as much as possible.
- No machine piling would occur on slopes steeper than 35 percent (about 20 degrees).
- RHCA buffer widths listed in Table 4 would be applied.

Table 4. RHCA widths

Type of RHCA	RHCA Width (Feet)
Category 1 - Fish-bearing stream reaches	300
Category 2 - Permanently flowing, non-fish stream reaches	150
Category 3 - Ponds, lakes, reservoirs, or wetlands larger than 1 acre	150
Category 4 - Seasonally flowing or intermittent stream reaches, wetlands smaller than 1 acre, landslides, and landslide-prone areas	100

- During layout, if questions about RHCAs arise or additional streams are found, the layout crew would consult with the project or district hydrologist and adjust RHCAs accordingly.
- No treatments, skid trails, landings, piled slash, or off-road wheeled or tracked equipment would be located within RHCAs. During underburning, no ignitions would take place within the RHCAs. However, fire would be allowed to back into the RHCA buffer to remove some of the smaller conifers and allow recovery of remnant hardwood shrubs.
- Any safety-hazard trees felled in RHCAs would be left on-site.
- Log hauling will be completed primarily on frozen or snow covered roads effectively eliminating the need for water sources for dust abatement activities. If limited hauling occurs outside of the winter period, hauling is limited to dry roads to minimize rutting and sediment runoff. If dust abatement is needed it will follow the requirements of the fisheries biological assessment and biological report.
- Underburning would be conducted when soil, duff, and large fuel are moist in order to retain beneficial duff as ground cover to prevent erosion and meet forest standards for ground cover.
- Where large pile burning occurs, areas would be seeded with weed-free seeds.
- "Subsoil" and revegetate with trees or grass all landings where feasible.
- In all treated areas, the minimum woody-debris and ground cover listed in Tables 5 & 6 would be retained through all phases of the project where they currently exist. Since much of the landscape is deficient in down logs, most existing large down logs (logs greater than 12 inches) would be retained during harvest and grapple piling activities.
- Protection of large logs will be an objective during underburning activities.

Table 5. Minimum woody debris standards

Forest Type	Minimum Diameter	Number of Logs/Acre	Minimum Length	Total Linear Feet/Acre
Ponderosa Pine	12 inches	3-6	6 ft	20-40 ft
Mixed Conifer	12 inches	15-20	8 ft	120-160 ft

- All disturbed soil occurring between 100 and 200 feet away from a stream or further than 200 feet that could erode into a stream would be seeded. Seeding of additional disturbed areas would be performed to forest standards.

- A project map would be provided for implementation showing buffer width requirements and minimum ground cover requirements for all units.
- Skid trails and disturbance near RHCAs would be monitored for erosion control for two years after project activities are completed and reseeded if necessary.

Table 6. Minimum required ground cover after management activities

Soil Erodibility	First Year %	Second Year %
Very High	60-75	75-90
High	50-60	65-75
Between Moderate & High	45	60
Moderate	38	50
Between Low & Moderate	30	40
Low	20	30

Unit-Specific Design Features

Based on conditions found during fieldwork, these design features were added:

- Unit 9 – Prohibit skidding across main draw.
- Unit 11 – Prohibit skidding across draw in southwest corner of section 20.
- Unit 30 – Buffer springs (100 feet) as far as channel is visible. Springs do not flow out of unit.
- Unit 49 – Prohibit skidding across main draw.
- Unit 51 – An additional category 2 stream was found and will be buffered with RHCA and avoided.
- Road 1600861 is soft near where unit 11 and 39 meet due to springs on the road. Upgrading and additional surfacing needed before winter use.

Monitoring Requirements

Monitoring would be conducted to assure that the project meets forest standards. The contract administrator monitors implementation of the project to assure that requirements for skid trail spacing and riparian buffers are met. Further monitoring will occur to ensure that soil cover standards are met.

Effects of the Alternatives

Effects of the alternatives on soil properties are described by comparing any changes in the amount of soil compaction, displacement, erosion, or excessive heating. Effects of the alternatives on water quality are described by comparing any changes in stream sedimentation rates, water temperature, or the stability of stream channel beds or banks. Information sources used to determine potential impacts include site visits during the fall of 2004 and spring of 2005, including walk-through surveys and soil transects; Malheur Soil Resource Inventory; and Malheur National Forest Post Harvest Monitoring.

Direct & Indirect Effects

If no action is taken, additional soil compaction, displacement, erosion, and excessive heating would be directly avoided, as there is no appreciable source of these problems currently operating in the project environment. Soil compaction currently present on a low percentage of the area from past activities would continue to recover naturally. Indirectly, however, there is some risk of excessive heating and additional erosion if a large fire were to burn in or through the area, because in the absence of the proposed action a fire could burn at generally very high (crown fire) intensity and easily resist human control. An intense, large wildfire would have serious short-term effects on soil conditions in the Crane Creek subwatershed. Hot fires remove much of the soil cover and may cause "hydrophobic" conditions, or a decrease in soil-infiltration capacity, thereby increasing overland water flows and surface erosion. In turn, this could decrease the soil's ability to recycle nutrients and its overall productivity. Similar to soil effects, water quality is not expected to change appreciably from its current condition except in the event of a large fire, which in the absence of the proposed action could burn with very high intensity. A large, intense fire in the area would cause eroding soil to reach stream courses and measurably increase sedimentation. This effect would persist for at least the short term (2-5 years), until native forest vegetation became reestablished in the burn area.

By comparison, the proposed action may directly increase soil compaction and excessive heating, mostly at log landings (these and other adverse effects such as displacement or erosion would be largely avoided in the general treatment area by virtue of the integrated design features, conservation measures, and monitoring requirements. At landings, however, additional compaction would occur as well as some excessive soil heating from burning "top piles" that would be created by whole-tree logging methods). There would be up to 50 landings associated with the commercial thinning. There could be up to 85 acres impacted by landings with an estimated 55 acres of these landing used during previous entries. This could lead to an increase in soil disturbance of approximately one percent for the project area as a whole and a 2 to 3 percent increase for certain treatment units. As the present soil disturbance in the project area as whole is less than 11 percent total, the predicted increase at landings would still result in considerably less than a total of 20 percent "detrimental conditions," or well within the applicable forest standard; and no individual treatment units (areas) would exceed the 20 percent limit. Additionally, adverse effects of compaction and burning top piles would be reduced after harvest activities are completed, by "subsoiling" landings (using equipment to loosen compacted soil and break up the ash layers) and then seeding each landing with a certified noxious-weed-free native seed mix.

Timber harvest and other mechanized activities of the proposed action would not measurably impact water quality, mainly because no appreciable soil erosion is expected. Additionally, riparian vegetation is protected by project design, meaning little or no stream-temperature increase would result, and there would be no in-stream activities or water-flow changes that could destabilize stream channel beds or banks.

Low-to-moderate intensity broadcast burning (surface fire) that is planned as part of the proposed action would have no appreciable adverse effects on either soil properties or water quality, by virtue of the integrated design features, conservation measures, and monitoring requirements.

Because the proposed action would substantially reduce current potential wildfire behavior and resistance to control, it correspondingly reduces the potential for severe impacts to soil properties

and water quality in the area—that is, erosion and short-term stream sedimentation, in the event of a large fire.

No streams within the project are on the 303d list. However, within the Crane Creek subwatershed, Crane Creek is on the 303d list for summer temperature concerns for bull trout from the mouth to Little Crane Creek. Little Crane Creek is listed for summer temperature concerns for bull trout from the mouth to Little Crane Creek. The project area is generally located about ½ mile north of Crane Creek. Proposed activities would not measurably affect summer temperature for Crane Creek or Little Crane Creek.

All proposed activities and their predicted effects are consistent with soil-and-water-related standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies. Regarding the particular requirement of the Clean Water Act to complete a Water Quality Restoration Plan (WQRP) where management activities have the potential to affect impaired waters (Section 303(d) listed) and a "Total Maximum Daily Load" is not yet in place: in this case a determination was made that a WQRP was not needed, because the project would not measurably affect the parameter (summer temperature) for which segments of Crane Creek, Little Crane Creek, and North Fork Malheur River were listed as impaired.

All direct and indirect adverse effects of the proposed action on soil properties and water quality are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on soil properties and water quality is the 29,388-acre Crane Creek subwatershed. The analysis area is watershed-defined because that is the natural boundary for understanding soil and water conditions and functionalities. Cumulative impacts analysis considers effects from past, present or reasonably foreseeable future ground-disturbing activities within the analysis area that may be influencing soil or water conditions in combination with the proposed action.

Related actions relevant to the analysis are the past, present, and reasonably foreseeable future actions noted and described in Appendix C. Prominent among these for their influence on current soil or water conditions are past timber harvests and associated road construction, large wildfires, and near-future road closures or road removals of the Phoenix project.

Cumulative effects were analyzed using the Equivalent Roaded Acres (ERA) method. Under this method, the watershed was rated by considering soils, streams, roads, fire history, and past activities and given a number showing susceptibility to adverse watershed effects from management activities. Proposed activities were also rated to evaluate their predicted effects on soil and water. The closer the calculated ERA value for the watershed is to the threshold value, the more chance the activities will have an overall detrimental impact to the watershed. The effect of past activities decreases over time, although the contribution of permanent roads to ERA does not change.

Table 7 shows the current "equivalent roaded acres"—expressed as a percentage of acres in the Crane Creek subwatershed—and the expected ERAs, both immediately after implementing the proposed action and over time. The computations over time include consideration of related, reasonably foreseeable future actions relevant to the analysis.

Table 7. Equivalent roaded acres as a percentage of acres in the Crane Creek Subwatershed

6th field Watershed	ERA Threshold	Present ERA	Proposed Action Addition	After Proposed Action	5 Years after Proposed Action	10 Years after Proposed Action	20 Years after Proposed Action
Crane Creek	17%	11.9%	0.8%	12.7%	10.1%	7.8%	5.8%

The immediate effect of adding the proposed action to the current condition is a 0.8 percent increase in the total subwatershed ERA. The resulting ERA total of 12.7 percent remains well below the threshold of 17 percent. Over time, ERAs decline to below the current level due to ongoing recovery of disturbed areas from past actions, wildfires, and the proposed action, and the future effects of closing or decommissioning roads under the Phoenix project.

All predicted cumulative effects of the proposed action are consistent with soil-and-water-related standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All cumulative adverse effects of the proposed action on soil properties and water quality are considered nonsignificant as proposed.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and the no-action alternative on soil and water can be found in "Soils and Hydrology Report (Thornton and Soupir, 2006)," located in the project record.

Snags and Woody Debris

Snags (larger, dead-standing trees) and down woody debris are important physical components of the affected human environment, under current public policy conveyed by the Forest Plan. Snags are valued because a variety of familiar birds and small mammals native to the Malheur National Forest depend on them for nesting, foraging, or roosting. Similarly, coarse woody debris on the forest floor is valued because it is a host for microorganisms involved in nutrient cycling and uptake by trees, a growing site for plants, and a foraging or resting site for a range of native animal life. Woody debris can also help stabilize naturally erosive soils that occur in a few portions of the project area.

Forest Plan Amendment 2 establishes minimum snag-maintenance levels at an average of 2.25 snags per acre of standing dead or dying trees 12 inches DBH or larger, and 0.14 snags per acre 21 inches DBH or larger, for a total average of 2.39 snags per acre. Current field data and modeling indicate the project area supports an average of about 3.82 snags per acre greater than 10 inches DBH (numbers of snags at or above 12 inches DBH are not differentiated), and of these snags an average of 0.79 per acre are over 20 inches DBH (numbers of snags at or above 21 inches DBH are not differentiated). For the subwatershed level, existing snags average 3.1 snags per acre 10-20" dbh and 1.2 snags per acre 20" dbh and greater.

While coarse woody debris is currently abundant enough to be contributing to a potential for uncharacteristically intense fire behavior, the large size-classes most desired for soil, plant, and animal benefits (wood greater than 12 inches in diameter) are generally under-represented or lacking. Table 8 displays results of surveys (field sampling) of down woody material in the project area.

Table 8. Range of existing tons per acre for size classes of down woody material

Size Class	>1 inch	1 to 3 inches	3 to 6 inches	6 to 12 inches	>12 inches
Tons/Acre	0.9-7.1	0.1-7.1	0.4-2.7	0.4-2.8	0

Snags and Woody Debris Design Features, Conservation Measures, and Monitoring Requirements

Detailed project design features and conservation measures for snags and woody debris are specified in either the Wildlife section or the Soil and Water section of this report. They are summarized here to aid review of this section.

- Proposed treatments would manage dead tree (snag) habitat to provide 100 percent of the potential populations of primary excavator wildlife species throughout stand rotation as per Forest Plan standards. Since conditions are generally below Forest Plan standards all "commercial harvest and precommercial thinning activities would retain existing snags greater than or equal to 12 inches DBH except where they create a safety hazard. Standing dead trees, which present a safety hazard, would be felled and left in place."
- Proposed treatments would retain or provide, at a minimum, the average densities of large woody debris by forest type outlined in Table 5 in the Soil and Water section. Prescribed fire parameters will be designed to limit the burning of large down logs to a point where their diameter is reduced by no more than a total of 3 inches.
- Snag and down wood monitoring will be completed after implementation to validate snag and down wood assumptions and modeling used during the analysis.

Effects of the Alternatives

Direct & Indirect Effects

Modeling indicates that with no action, in the year 2015 the project area would contain an average of 4.75 snags greater than 10 inches DBH per acre, of which 0.87 per acre would be greater than 20 inches DBH (Table 9). Snag numbers would increase from the current condition due to trees dying from the effects of increasing tree-to-tree competition. These numbers do not reflect mortality from expected bark-beetle activity and so probably underestimate the stocking density of future snags. In the near-to-long term, the likely bark-beetle activity would also increase down woody debris in the large size-classes, perhaps very substantially, as current and future snags fall.

Table 9. Snag numbers

	Snags Per Acre Greater Than 10"DBH	Snags Per Acre Greater Than 20"DBH
Current Condition (2005)	3.82	0.78
No Action 2015	4.75	0.89
Proposed Action 2015	4.66	0.94

By comparison, modeling of the proposed action indicates that in the year 2015 the project area would contain slightly more large snags per acre than without action, keeping mind, however that future snags under "no action" may be underestimated. On the negative side, some snags would be lost in commercial thinning and burning areas from felling for worker safety requirements. Also, fewer trees would die from competition in the short- to near term and become snags as a result of the proposed action, as it would improve the vigor of retained trees. But prescribed burning would create snags in the short term by inadvertently killing some trees, including some in the large size-classes; and the availability of large trees for snags would continue to increase in the long term with the development of late- and old-structure conditions in the treated stands. In 2015, both scenarios—no action and proposed action—appear to exceed the minimum snag-maintenance levels of 2.25 snags per acre of standing dead or dying trees 12 inches DBH or larger, and 0.14 snags per acre 21 inches DBH or larger. Regarding large woody debris, the proposed action would achieve the desired concentrations in the mid- to long term by virtue of project design features and conservation measures to protect and retain current large woody debris (12 inches in diameter or larger), including any snags that must be felled for worker safety requirements; and through recruitment of new snags that will be created by some large trees being inadvertently killed by prescribed fire, which trees in turn will fall and become large woody debris.

All proposed activities and their predicted effects are consistent with snag and woody-debris standards of the Forest Plan and its associated amendments.

All direct or indirect adverse effects of the proposed action on snags and woody debris are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on snags and woody debris is the project area, because Forest Plan direction for these resources is oriented toward localized conditions—managing for snag numbers or woody debris concentrations within stands or project areas. The analysis timeframe begins in 1973 at the start of intensive timber-management projects influencing current snag and woody debris conditions, and extends to 2015 because that is when changes resulting from all proposed treatments—including harvests, noncommercial thinning, and prescribed burning—can be seen using computer modeling. Related actions most relevant to the analysis are the past, present, and reasonably foreseeable timber harvests and fuel-reduction actions noted and described in Appendix C.

Past activities probably greatly reduced snag numbers, especially the large trees. With subsequent stand growth and increasing forest density over time, however, trees have been dying from competition for site resources and from bark-beetle attacks. This has recently greatly increased snag numbers of all size-classes. Treatments of the proposed action designed to reduce

tree-to-tree competition and bark beetle attacks—noncommercial and commercial thinning, and underburning—would also reduce the rate at which snags are currently being created. However, treatments would not remove dead trees greater than 12 inches DBH except as required for worker safety, and prescribed burning would create some snags in the short term. The result is that over the next decade, snag numbers would be stable and the numbers of larger snags would increase slightly. Large size-class woody debris that is currently under-represented possibly due to past actions would be gradually restored to desired levels by virtue of project design features and conservation measures, and by recruitment of new snags, some of which in turn will fall in the mid-to-long term.

All predicted cumulative effects of the proposed action are consistent with snag and woody-debris standards of the Forest Plan and its associated amendments.

All cumulative adverse effects of the proposed action on snags and woody debris are considered nonsignificant as proposed.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and the no-action alternative on snags and woody debris can be found in "Silviculture Report (Amell, 2006)," "Soils and Hydrology Report (Thornton and Soupir, 2006)," and "Terrestrial Wildlife Report (Oechsner, Bush, and Schuetz, 2006)," located in the project record.

Biological Components of the Human Environment

Biological components of human environment that may be affected include forest vegetation, wildlife, fisheries and amphibians, noxious weeds (invasive plants), and sensitive plants. Impacts to each of these are discussed in individual sections below.

Forest Vegetation

Current forest vegetation conditions in the project area, in comparison to historic conditions and those indicated as desired under current forest management policy, are all described in some detail in Part 1: Need for the Proposal.

The analysis of changes to forest vegetation that would occur under each alternative is focused on the following environmental factors:

- The **presence of large trees in the area,** both currently and in the future
- The **variety of other tree size-classes and cover conditions** that contribute to scenery, recreation, and wildlife values of the area
- **Tree species compositions and stocking levels** that influence resilience of the forest to wildfires and bark beetles
- **Native shrubs, forbs, and grasses** of importance for wildlife habitat or permitted livestock grazing

Impacts concerning noxious weeds (invasive plants) or sensitive plants are addressed in separate sections of this report.

Forest Vegetation Design Features, Conservation Measures, and Monitoring Requirements

The proposed action is designed to change—toward the desired forest conditions described in Part 1—current stocking densities, vertical stand structures, and the vigor of large trees, to make the forest less likely to experience a bark-beetle outbreak while also reducing fuel hazards and advancing the natural development of a more fire-resilient forest. Following are detailed descriptions of the types of forest-vegetation treatments (silviculture) employed in the proposed action, including special design features or conservation measures to meet particular forest-management needs. Combinations of these treatment types form the stand-level treatments described in Part 2 and shown on the proposed action map (Figure 3).

- **HTH (Commercial Thinning).** Goals for thinning treatments involve reducing bark beetle risk, and advancing the forest in this area toward achieving the historical range of variability in stand structures as soon as possible. In general, the commercial thinning treatments would involve cutting trees between 7 and 21 inches DBH and would favor retaining seral species (those typical of the stages of forest succession in this area—ponderosa pine, western larch, quaking aspen) over climax species (those that would eventually dominate these sites in the absence of periodic or stand-replacing fires—Douglas-fir, grand fir). Exceptions to this are noted below. No snags greater than 12 inches DBH would be removed except for safety and implementation (e.g. road construction) reasons.
    - Where the stands contain trees of a variety of sizes (uneven-aged), the commercial thinning would thin all size-classes up to 21 inches DBH to advance stands toward an open, uneven-aged structure and composition similar to the historic stand types that are currently under-represented. Due to the lack of large and old trees, and current higher than historic numbers of trees in the small size classes, thinning would concentrate on thinning-from-below, removing mostly small-diameter trees and retaining the larger diameter trees. In stands that have greatly changed from the historic dominance by seral species to dominance by grand fir, the desire to retain the more fire-tolerant seral species would mean that in places, some of the larger grand fir trees up to 21 inches DBH would be removed to favor retaining smaller seral species trees.
    - In stands that have been converted to a more uniform-sized and even-aged structure, the commercial thinning would thin from below to retain the largest seral species trees. Although the thinning would alter the stands toward dominance by ponderosa pine, attempts would be made to retain a mixed-species composition similar to historic stands. In many stands, the trees are relatively evenly spaced. During commercial thinning in these stands, one group of 3 to 5 closely spaced ponderosa pine trees would be retained for every two acres to create future small clumps of large trees typically found in ponderosa pine stands subject to frequent, low-intensity and low-severity fires.
    - Within the visual foreground of Forest Road 16, tree spacing would be deliberately varied widely to retain a more non-uniform and unmanaged appearance.
    - In Unit 23, the thinning would be modified to maintain habitat for pileated woodpeckers. In this unit, all grand fir less than 21 inches DBH would be removed from within 50 feet of trees greater than 21 inches DBH. Seral species trees within 50 feet of trees greater than 21 inches DBH would be thinned. Fifteen percent of the stand area would be retained unthinned in patches of about one-quarter acre in size. The unthinned patches would, as much as possible, include medium-sized trees. Outside of the unthinned patches, the smaller trees would be precommercially thinned.
    - Units 8, 9, 10, 23, and 25 contain travel corridors between late- and old-structure stands. Travel corridors should be at least 400 feet in width (USDA Forest Service 1995a) and

are mapped. Thinning within the corridors would be adjusted to not reduce canopy cover to less than 66 percent of site potential as required by Regional Forester's Forest Plan Amendment 2 for travel corridors.

- Diseases of concern in the 16 Road project area include two strains of annosus root rot (*Heterobasidion annosum*) that affect conifers found in the area. The S strain mostly infects true firs, and the P strain mostly infects pines. Annosus spreads over long distances by spores, and over short distances from tree to tree through root contact. Tree cutting can increase the spread of annosus by providing fresh-cut stump faces for the spores to land on and infect. Both strains of annosus root rot can be found in the project area.
    - Integrated pest management activities to prevent the spread of annosus include the use of a borax-based product (sodium tetraborate decahydrate or disodium octaborate tetrahydrate) such as Sporax to treat freshly cut tree stumps, and the management for non-host tree species in areas of known root rot centers.
    - To prevent the spread of annosus due to tree cutting in the 16 Road project, a borax product (Sporax) should be applied to all cut ponderosa pine or lodgepole pine stumps over eight inches in cut-face diameter if the trees are cut with mechanical shearers or 12 inches in cut-face diameter if the trees are cut with chainsaws. In proposed Unit 23, grand fir stumps should also be treated. The stumps should be treated within 24 hours of cutting. During winter logging, exceptions to treating stumps should only be made if the stumps are covered with snow before the borax treatment can be made.
    - Within the 16 Road project area, borax application will be approximately one pound per treated acre, but will vary from stand to stand depending upon the number of trees removed and tree sizes.

- **SPC (Precommercial Thinning).** Depending upon tree sizes and stocking levels of individual stands, precommercial (noncommercial) thinning would occur following a commercial thinning, or as the primary stocking control treatment, or not at all. Precommercial thinning involves the cutting of trees less than seven inches DBH. The precommercial thinning would advance stands toward historic stocking levels, size- and age-class composition, and species composition. During precommercial thinning, one small group of 3 to 5 closely spaced ponderosa pine trees would be retained every two acres to create future small groups of large trees. Within visual foreground of Forest Road 16, tree spacing would be deliberately varied widely to retain a more non-uniform and unmanaged appearance. Unit 41 contains a travel corridor and the thinning would be adjusted to not reduce canopy cover to less than 66 percent of site potential.
- **FHB (Fuels Reduction Hand Pile and Burn).** This is a type of prescribed fire where down woody material is cut into smaller sized pieces, arranged in piles, and burned later.
- **FUB (Fuels Reduction Underburn).** In this treatment, low-intensity prescribed fire would be used to reduce down woody fuel loadings, reduce stocking in small-diameter trees, and raise crown heights by killing lower tree branches.
- **LS (Lop and Scatter).** Lop: to chop branches, tops, and small trees after felling into lengths so that the slash will lie close to the ground. Scatter: to spread the lopped slash more or less evenly over the ground. This treatment is used to modify fire behavior by dispersing concentrations of down woody fuels and compacting the fuel bed.
- **WT (Whole Tree Yarding).** In this treatment, felled trees are transported from the woods with their crowns attached. It is generally used to reduce post-timber-harvest, down-woody

fuel loadings by removing the treetops and limbs to collection areas where they can be burned or utilized as posts and poles or chips.

- **Quaking Aspen Restoration.** Aspen stands would be identified for protection or special enhancement treatments on an individual-group or clone basis, within the proposed treatments for reducing fuel hazards or bark-beetle risk that apply to the larger, surrounding stand. These protection and enhancement measures would follow forestwide direction and standards (Forest Plan Chapter IV, p. 31 item #57). Presently, 29 aspen sites totaling 68 acres are identified for treatment within the project area and specific protection or enhancement measures have been developed for each site. General design features and conservation measures that apply to these sites are as follows:
  - All aspen sites would receive protection (fencing, according to detailed specifications for each site) prior to or immediately after any treatment(s) to ensure new sprouts are protected from negative impacts caused by elk, deer, or cattle grazing. If individual aspen stands cannot be protected, there should be no other treatments within them.
  - Low-intensity fire would be allowed to creep into RHCAs where associated burning treatments are proposed. Aspen stands inside these areas would be protected using various fencing or caging applications.
  - To reduce competition between conifers and aspen (outside of RHCAs), all conifers less than 21 inches DBH inside aspen stands and within 100 feet of mature aspen stems would be cut and removed. For retained each conifer greater than 21 inches in diameter within the area, two additional trees of differing sizes that are less than 21 inches would also be retained. Tree felling and removal operations would be conducted to minimize damage to existing aspen clumps. Where necessary, methods such as directional hand felling, and cable winching of downed trees would be used. Commercial and precommercial slash material would be removed within and to a distance of 15 feet away from any existing aspen stems. A low-intensity prescribed burning treatment would be applied to these stands.
  - Treated aspen stands should be monitored for 3 to 5 years to ensure protective fencing has not been damaged.
- **Shrub Restoration.** Significant communities of mountain shrubs would be maintained or enhanced (Forest Plan Chapter IV, p. 28, item #32). These areas would be identified during pre-implementation surveys, flagged, and avoided or protected as follows:
  - No treatment would occur on open area scabland where mountain mahogany stands are present within the project area.
  - In areas where mountain mahogany is an understory component of a heavily stocked pine overstory, directional felling of trees away from these remaining mountain mahogany individuals should be implemented to minimize damage to remaining individuals. If burning is proposed in the area, collect viable mature seeds prior to burning for use in revegetation in the event that fire is detrimental to remaining individuals. A very low intensity fire should only be used in these areas.

Effects of the Alternatives

Direct & Indirect Effects

If no action is taken, current stand structures would likely persist in the short term and change only slowly over time, until disturbed by bark beetles, fire, or other agents. These current stand structures reflect some variety of tree size-classes and cover conditions, but compared to the

historic range of variability, they are overbalanced toward dense, closed-canopy, immature forests and underbalanced toward late or old structure forests typified by large trees. In the densely stocked stands, tree diameter growth would continue to decline, keeping large trees under-represented in the near future and delaying attainment of late or old forest structure in candidate stands. Development of lower-level shrubs, forbs, and grasses would remain essentially stable in the short term and gradually decline over time from shading and competition, until bark beetles or fire reduced the upper-level tree canopy. Small stands or micro-patches of quaking aspen—currently in a general state of decline—would continue to be grazed, browsed, and overtopped by competing conifers, and some of the smallest patches might disappear over time. Grand fir composition, which in many stands is above its historic level, would continue to increase and contribute to higher total stand densities. Dense stands currently at risk of bark-beetle activity (most stands in the project area) would continue to be at risk, and bark beetle activity would certainly increase in the near future. General stand conditions would continue to have potential for high-intensity crown fire behavior, if a fire were to occur. A likely effect of such a fire on those stands currently approaching late or old structure with large trees would be to transform them back to a stand-initiation stage—with a low stocking of surviving large trees or vertical layers of vegetation.

By comparison, the proposed action would reduce the proportion of dense, closed-canopy forest and increase the proportion of less dense, open-canopy stands. The balance of tree size classes and forest stand structures would immediately change toward larger diameter, upper-level trees, because proposed treatments focus on removing or burning smaller, lower-level trees. Growth of large trees would accelerate and candidate stands would advance more quickly toward late or old structure conditions. A variety of vertical stand structures would still be present, however, by virtue of current differences between individual stands or differences in treatments prescribed for them. Similarly, there would be variety in horizontal density, tree canopy coverage, and tree species within or between stands, by virtue of design features or conservation measures to protect riparian vegetation, enhance quaking aspen patches, establish late-and old-structure connection corridors, retain big game hiding cover, and maintain scenic quality in the Road 16 visual corridor. Lower-level shrubs, forbs, and grasses would temporarily decrease in burn areas, then increase in the short- to mid-term in all treated areas, from more available nutrients and sunlight. The density of many stands currently at risk of bark-beetle activity would be immediately reduced toward the recommended lower management zone, allowing retained trees to become more vigorous and making the microclimate surrounding them less favorable for beetle population buildups. As a result, serious beetle outbreaks in these areas would become far less likely for about 20 years. Bark-beetle risk would be reduced to lesser degrees in other stands that are thinned less intensively or only underburned to conserve various wildlife habitat components (representing about 40 percent of the current high-risk area). As a general consequence for forest vegetation of the project area, resiliency to wildfire would improve, meaning that future fires in the area would likely cause effects of mixed severity, including survival of many large trees and some forest patches or vertical layers.

The application of borax to freshly cut stumps is unlikely to cause an adverse effect to any forest vegetation or other natural resource or environmental value of the area; the product is applied in very low dosage (about one pound per acre), and it is rapidly diffused into the fresh stump, where most of it is retained for the long term. Borax treatment of cut stumps will serve to block the introduction of detrimental fungal spores into the root systems of retained large trees.

The project is consistent with Healthy Forest Restoration Act (HFRA) direction. HFRA, Section 102 (e), directs states that…if the management direction in a resource management plan (Forest

Plan) for an old growth stand was established before December 15, 1993, that HFRA covered projects shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure. Review management direction for covered HFRA projects, taking into account any relevant scientific information made available since the adoption of the management direction; and amend the management direction to be consistent with pre-fire suppression old growth conditions, if necessary to reflect relevant scientific information.

To address HFRA direction a historic condition analysis was completed. This analysis, called a Historic Range of Variability Analysis (HRV), is required by Regional Forester's Amendment #2 for projects that include timber sales. Forest Plan Amendment #2 went into effect June 5, 1995, and was the result of an interdisciplinary analysis conducted to determine the best approach for maintaining future planning options concerning wildlife habitat associated with Late and Old structural stages (LOS) and old forest abundance. The HRV analysis completed for the 16 Project included an assessment of the amount of current LOS and was completed on a subwatershed basis for each biophysical environment found. In the assessment, existing proportions of LOS were compared to the historic range that was thought to have existed prior to settlement. The actual estimates of the historic range were based on published research, historic timber inventories, other available science, and professional judgement. Specific details of the HRV analysis can be found in the 16 Road Forest Health and Fuels Reduction Project Silviculture Report (Amell, 2006). In the proposed action alternative, about 27 acres of warm-dry plant association group (PAG) old forest multi-stratum (OFMS) would be converted to old forest single stratum (OFSS) structure by the combination of thinning and underburning treatments. This treatment would increase the amount of OFSS, which is lacking in the subwatershed. The amount of OFMS would decrease slightly but would still be within the historical range. Forest Plan Amendment #2 allows manipulation of one type of LOS to move stands into the LOS stage that is deficit if this meets historical conditions. Historically, vegetation in the hot-dry and warm-dry PAGs was commonly burned by frequent, low-intensity and low-severity fires. These fires generally maintained the stands in an open, park-like condition that was dominated by ponderosa pine. Conversion of the 27 acres to OFSS would move stand condition to a pre-fire suppression old growth condition characteristic of the forest type.

Regarding large tree requirements of the Healthy Forests Restoration Act in particular, the proposed action is consistent with the requirement to retain large trees of fire-resilient species appropriate to the forest type(s) while removing mostly smaller trees. In so doing, the proposed action serves the HFRA purpose of imitating historic forest conditions in this fire-adapted ecosystem, to the end that future wildfires in the area may be less intense and cause less-severe impacts on both natural resources and human environmental values.

Relevant scientific information used in the analysis to describe pre-fire suppression old growth conditions and old dependent species habitat needs is cited in the 16 Road Forest Health and Fuels Reduction Project Silviculture Report, and Terrestrial Wildlife Report. Based on review of relevant scientific information, no amendments to current management direction were proposed to be consistent with pre-fire suppression old growth conditions. All proposed activities and their predicted effects are consistent with forest vegetation standards of the Forest Plan and its associated amendments, including the 1995 Regional Forester's Forest Plan Amendment #2:

Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales, and the requirements of other applicable laws, regulations, and policies.

All direct and indirect adverse effects of the proposed action on forest vegetation are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on forest vegetation is the Crane Creek subwatershed, because Forest Plan direction is to analyze the historic range of variability on a watershed level. The time scale for the cumulative impact analysis is from the point at which stand treatment information was available, which is 1973, to about ten years into the future (2015). At that time, other activities currently listed in the Schedule of Proposed Actions would likely be accomplished. Related actions relevant to the analysis are the past, present, and reasonably foreseeable actions noted and described in Appendix C.

Past grazing, fire management, wildfires, timber harvest, precommercial thinning, prescribed burning and regeneration treatments have resulted in the current cumulative condition. That is, within the subwatershed, late and old forest structure is lacking, stands are much younger and denser than historically, they have a greater proportion of late seral and climax species than historically, and a large portion of the subwatershed is at risk of bark-beetle buildups and severe effects on vegetation in the event of a wildfire. The proposed action would not make this cumulative condition worse; rather, it would cause beneficial changes to forest vegetation on a small portion of the subwatershed by reducing stand densities, increasing the growth and development of large trees, shrubs, forbs and grasses, increasing the proportion of early seral species (ponderosa pine, western larch, quaking aspen), and reducing the risk of bark-beetle outbreaks or severe fire effects in stands advancing toward late or old forest structure.

The only other fuels or vegetation management project listed on the 2005 Schedule of Proposed Actions (USDA Forest Service 2005) that would occur within the subwatershed is the Crane Prairie Administrative Fuels Reduction Project. This project would involve several acres of fuels reduction within the Crane Prairie Guard Station Administrative site. Four other projects within the Crane Creek subwatershed appear on the five-year action plan, but whether these projects will actually occur is tentative, and what they would specifically involve is unknown. It is believed, however, that under current management direction, all of these reasonably foreseeable projects would have purposes and designs similar the 16 Road Forest Health project, and corresponding beneficial effects on the cumulative condition of forest vegetation in the subwatershed. Therefore, the effect of the proposed action in relation to these other actions is seen as adding to their probable beneficial effects.

All predicted cumulative effects of the proposed action are consistent with forest vegetation standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

No adverse cumulative impacts of the proposed action on forest vegetation are predicted.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on forest vegetation can be found in “Silviculture Report (Amell, 2006),” “Botany Report and Biological Evaluation for Threatened, Endangered, and Sensitive (TES) Plant Species (Laufmann, 2005),”

"Terrestrial Wildlife Report (Oechsner, Bush, Schuetz, 2006)," and "Range Resource/Noxious Weeds Specialist Report (Laufmann, McArthur, 2006)," located in the project record.

Wildlife

Wildlife is an important component of the affected human environment, because the public places high value on this resource, and has expressed these values through many public laws, regulations, and policies that pertain to the project. External review and comments on the proposal confirmed these values.

Wildlife species to be protected under the Endangered Species Act are those listed by the U.S. Fish and Wildlife Service as threatened, endangered, or proposed for federal listing. Wildlife species whose population viability is a current concern are listed as sensitive by the Regional Forester, Pacific Northwest Region (R6) of the Forest Service. The Forest Plan provides direction for the above categories plus several more, as follows:

- **Management Indicator Species (MIS)**—species selected by the Malheur National Forest as "barometers" of species diversity, viability, and the forest ecosystem. They are monitored over time to assess how changes in forest conditions (especially from management) affect MIS populations and habitat, and thus also populations of other species with similar habitat needs. Pine marten, pileated woodpecker, and northern three-toed woodpecker represent old growth habitats. Rocky Mountain elk represent big game species. Primary cavity excavators (most woodpeckers) represent dead wood habitats.
- **Featured species**—those of high public interest and demand in the local area
- **Raptors**—birds of prey

Additional applicable laws and policies not specifically addressed by the Forest Plan provide direction for conservation of migratory and resident land birds. This direction is consolidated in the Forest Service Landbird Strategic Plan and further developed through the Partners in Flight Program. The Oregon-Washington Partners in Flight Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000) identifies priority bird species and habitats for the Blue Mountains in Oregon.

Taken together, these applicable wildlife categories comprise more than 60 separate species, some of which are listed in more than one category. Of these, 33 are known to occur in or have habitat in the project area, or are otherwise potentially affected by proposed activities. Conserving these 33 species and their habitats is considered to provide a desirable balance of diverse habitats for all relevant species, including others that occur in the area but are not listed in any special management category.

Wildlife Design Features, Conservation Measures, and Monitoring Requirements

The proposed action involves the following wildlife special features:

- To conserve habitat for a broad variety of animal life that depends upon wood on the forest floor, proposed treatments will retain or provide, at a minimum, the average densities of large woody debris by forest type outlined in Table 5 in the Soil and Water section. Prescribed fire parameters will be designed to limit the burning of large down logs to a point where their diameter is reduced by no more than a total of three inches.
- To conserve habitat for primary cavity excavators, which are management-indicator species of the Malheur National Forest, proposed treatments would manage dead tree (snag) habitat to provide 100 percent of the potential populations of primary excavator species throughout

stand rotation as per Forest Plan standards. Since conditions are generally below Forest Plan standards all "commercial harvest and precommercial thinning activities would retain existing snags greater than or equal to 12 inches DBH except where they create a safety hazard. Standing dead trees, which present a safety hazard, would be felled and left in place."

- Snag and down wood monitoring will be completed after implementation to validate snag and down wood assumptions and modeling used during the analysis.
- To conserve habitat of the goshawk, a featured species of the Malheur National Forest known to use habitats of mature and old forest structure, no treatments involving timber harvesting or other cutting are proposed in suitable nesting habitat around existing goshawk nests. Specifically, 30 or more acres of the most suitable nesting habitat surrounding each active and historical nest tree are deferred from any cutting. Additionally, 400-acre post-fledging areas surrounding goshawk nests will be treated to enhance goshawk prey conditions and advance these stands toward late or old structure conditions. Project activities will be prohibited in occupied goshawk territories (fledgling areas and within one-half mile of a known occupied nests) between April 1 and September 30 to avoid possible disturbance of goshawk pairs while bonding and nesting.
- To conserve nesting habitat of raptors (birds of prey), a biologist would be consulted to establish a nest zone buffer around any raptor nest discovered prior to or during project layout, and, if appropriate, to restrict activities within the nest area during occupancy, according to requirements of the species involved.
- Maintain the nest trees of active raptor nests and immediately surrounding habitat and avoid or reduce potential adverse impacts from management activities during the nesting season. Protection measures will be developed based on site characteristics and biological needs of the species. Where possible, retain trees with inactive nests that may be important to secondary nesters (e.g., great gray owl).
- To conserve habitat of big game species including elk, a management-indicator species of the Malheur National Forest, standards of habitat-effectiveness index and satisfactory and marginal cover will be met.
- Horizontal hiding cover will be provided by retaining non-thinned patches of forest trees as necessary throughout the project area, with emphasis on relatively flat topography and around existing snags for their further protection.
- Connectivity corridors between potential "late and old structure" (LOS) stand conditions and between all Forest Plan designated "old growth" will be maintained to meet Forest Plan Amendment #2 wildlife standard. Amendment #2 gives direction for maintaining connectivity between these habitats to allow the free movement of old-growth-associated terrestrial wildlife species. LOS and dedicated old growth stands are distributed throughout the Crane Creek subwatershed; there is not, however, any dedicated old growth or replacement old growth in the project area itself.
- To conserve potential "late and old structure" (LOS) stand conditions in the project area and connectivity between such stands both within and adjacent to the project area, proposed thinning or burning in stands exhibiting LOS or connection-corridor potential will be specifically designed and controlled to enhance and accelerate the development of LOS values.
- Canopy closures within treated connectivity corridors will be maintained within the top one-third of site potential.

- To conserve the integrity of unique habitats, a 100-foot buffer of cover will be maintained around a den site, elk wallow, bog or seep etc., should one be discovered during project layout.
- Maintain grouse winter roost habitat. The preferred habitat is clumps of mistletoe-infected Douglas-fir on tops or upper slopes of ridges.

Effects of the Alternatives

The analysis of changes to wildlife that would occur under each alternative is focused on the following environmental factors:

- **Diversity of habitats**
- **Habitat with qualities of late or old stages of forest succession** ("late or old structure"—LOS)
- **Elk habitat effectiveness**
- **Lynx habitat**
- **Wildlife disturbance or displacement**
- **Threatened, endangered or proposed species listed under the Endangered Species Act**
- **Region 6 sensitive species listed by the Regional Forester**
- **Management indicator species (MIS) of the Malheur NF**
- **Featured species of the Malheur NF, big game, primary excavators, and raptors (birds of prey)**
- **Priority migratory or resident landbirds identified through the Partners in Flight Program**

Detailed consideration of effects was also focused on the 33 species from the applicable categories of wildlife that are known to occur in or have habitat in the project area, or are otherwise potentially affected by proposed activities. Avoiding significant adverse effects on these species and their habitats is considered to avoid significant adverse effects on all wildlife species potentially affected by the proposed action.

In conjunction with direct and indirect effects, the wildlife analysis accounts for incremental, or cumulative, effects of the proposed action when added to other past actions that have occurred since the 1970s, because some of these past actions still influence the current habitat conditions in and around the project area that were studied. Additionally, important cumulative effects of the proposed action in combination with present or future related actions are discussed. Related past, present, and reasonably foreseeable future actions relevant to these analyses are noted and described in Appendix C. The Crane Creek subwatershed was selected as the general analysis area for cumulative effects to wildlife, for these reasons:

- Vegetation changes that have occurred in the project area since 1970 are similar to those that have occurred at the larger subwatershed scale during the same timeframe.
- Similar species inhabit similar habitat in the subwatershed and the project area.
- Species such as elk that require home ranges larger than the project area are evaluated on a subwatershed basis on the Malheur National Forest.

Cumulative impacts to one threatened species, lynx, were considered for a different area called the Glacier Lynx Analysis Unit—37,523 acres lying adjacent to and directly north of the project area involving 80 acres in common. The Glacier LAU is the appropriate area for considering cumulative effects to this species, because it has been designated as an area of sufficient size to provide habitat types and features preferred by lynx.

The duration of effects on the wildlife resource is described according to these terms and definitions:

- Immediate – Approximately one growing season or several months or less
- Short term – Approximately 1 to 5 years
- Mid-term – Approximately 6 to 15 years
- Long term – Greater than 15 years

Direct, Indirect, and Cumulative Effects

Habitat Diversity: If no action is taken, many forest stands would remain multistoried in the short- and mid-term, favoring those wildlife species that prefer uneven-aged forests. Densely stocked stands would continue to provide hiding and escape cover for various species, and thickets would continue to be available for species that prefer them for nesting or roosting. Over several decades, as grand fir composition increases and gradually comes to dominate some stands, the overall diversity of wildlife habitats would decline somewhat, because fewer terrestrial vertebrate species use grand fir forests for reproduction and feeding than ponderosa and mixed-conifer forests (Thomas 1979). Additionally, the predicted continuing decline of quaking aspen in the area would have an adverse effect on wildlife, as aspen stands or micro-patches are an important habitat component for many species.

By comparison, the proposed action would immediately change much of the forested wildlife habit—through low thinning or underburning—toward lower stand densities and accelerated development of large trees, while still retaining certain key habitat components of the current

condition. The proposed action would provide long-term habitat diversity by increasing the proportion of early seral species (ponderosa pine, western larch, quaking aspen) and reducing the proportion of forest stands currently trending toward domination by grand fir. Where underburning is prescribed, the immediate wildlife-habitat effects would include: 1) recycling nutrients, thereby increasing vegetative ground cover and the associated insect prey base in the short term, 2) maintaining or enlarging open spaces between trees, and 3) eliminating many seedlings or lower layers of trees in stands that currently have multiple vertical layers. Thus, in the short to mid-term, wildlife species that hide in or feed on grasses, forbs, shrubs and berries would benefit as more ground cover vegetation develops in response to treatment; but species that currently use higher-level thickets for hiding, nesting and roosting would have less of this habitat available. Design features would be included to retain untreated patches of trees across the landscape for vegetation diversity.

All of the activities in Appendix C have been considered for their cumulative effects on old growth species. Past activities and events such as timber harvest, fire suppression, livestock grazing, road construction and wildfire have combined to create the current condition of habitat in the analysis area. HRV tables in the Silviculture Report reflect the effects of past activities on structural stage. The effects of past management have primarily been to reduce habitat diversity. Since 1993, the Forest Plan as amended has generally directed the Malheur National Forest to conduct management activities in a manner that moves stands back towards historic conditions. Future thinning and burning projects listed in Appendix C would design projects to meet this direction as well. In the short-term, the no action would not contribute to habitat diversity. In the mid- to long-term, the no action alternative would elevate the risk of a stand replacement fire that could reduce diversity. In the short-, mid- and long-term, the proposed action would contribute positively to cumulative effects by shifting stands back towards historic conditions, improving habitat diversity.

Late and Old (LOS) Structural Stages: The Forest Plan identifies three Management Indicator Species (MIS) for old growth, primarily Old Forest Multiple Strata (OFMS) structured stands: pileated woodpecker, pine marten and three-toed woodpecker. In addition, the white-headed woodpecker is a good indicator of the health of Old Forest Single Stratum (OFSS).

OFMS stands are within HRV for all biophysical environments except the hot dry environment. In the Crane Creek subwatershed, OFMS occurs on 3% of the hot dry biophysical environment; historically, this structural stage occurred on 5-15% of this biophysical environment. OFSS is below HRV, primarily due to past timber harvest and fire suppression. In the Crane Creek subwatershed, OFSS occurs on <1% of the warm dry and hot dry biophysical environments. Historically, this structural stage occurred on 15-55% and 20-70% of the warm dry and hot dry biophysical environments, respectively. Existing LOS stands are well connected by connectivity corridors.

The no action alternative has no direct effects on existing LOS. Within the project area, current stand structures and high stocking levels would persist. Individual tree growth would continue to decline. Declining tree growth would increase the time required for trees to grow sufficient large trees to be classified as late and old structure. In about 25 years, some stands could achieve late or old structure (Amell 2005) that is important for feeding and reproduction by certain MIS or featured species, including pine martens, pileated woodpeckers and northern goshawks. Long-term development of old growth could be diminished, however, if stand development is disrupted by bark-beetle activity (likely) or severe fire effects (possible). Stands would move towards old growth conditions that are more supportive of species that require high canopy cover

such as the pileated woodpecker, pine marten and northern goshawk, and diverge from open stand conditions that support species such as the white-headed woodpecker and flammulated owl.

The proposed action would have little effect on existing LOS. About 27 acres of OFMS will be immediately converted to OFSS structure by a combination of thinning and underburning treatments. This conversion treatment is appropriate in the warm dry biophysical environment. Changes in acres of OFMS and OFSS are sufficiently small in the short term to have little effect to HRV at the subwatershed scale. The main benefit from thinning and underburning treatments would be realized in the mid- to long-term. Treatment of YFMS, UR, SECC and SEOC stands would increase tree growth rates, accelerating the development of LOS as compared to the no action alternative. Treated stands would likely be managed towards OFSS, currently, the most limited forest habitat. Stands would move towards old growth conditions that are more supportive of species that require lower canopy cover such as the white-headed woodpecker and flammulated owl, and diverge from high density stand conditions that support species such as the pileated woodpecker, pine marten, and northern goshawk.

Under the no action, habitat for pileated woodpeckers and pine martens would increase slightly as stand density and canopy cover increases. Populations would not be expected to change in the short- to mid-term, and could potentially increase in the long-term. Under the proposed action, there would be a slight reduction in habitat for the pileated woodpecker and pine marten. Thinning and prescribed underburning is intended to reduce understory cover and open up stands, shifting stands towards historic conditions. No activities would occur in primary habitat for pileated woodpecker and pine marten. About 192 acres of secondary habitat would be treated, degrading habitat in the units treated. The acres affected would be considered incidental at the subwatershed level. Under both the no action and proposed action alternatives, primary and secondary habitat would remain plentiful; stand growth projections indicate habitat would increase in the mid-to long-term. Under both the no action and the proposed action alternatives, the Forest's network of Dedicated Old Growth (DOG) and Replacement Old Growth (ROG) would also continue to maintain populations.

Under the no action alternative, white-headed woodpecker habitat would not change in the short-term. OFSS would remain below HRV, limiting habitat for white-headed woodpecker and other species associated with OFSS. Under the proposed action, treatments in warm dry biophysical environments would shift stands towards this historic condition. Following treatment, many stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover with scattered shrub cover and pine regeneration. In the short-term, stands would still not have the requisite number of large diameter trees to classify as LOS, but desired species such as the white-headed woodpecker would still be expected to respond favorably. Populations of white-headed woodpecker would not be expected to change in the short- to mid-term, and could increase in the long-term.

For three-toed woodpeckers, the Forest Plan requires 75 contiguous acres of old growth lodgepole pine for nesting and roosting. Since there is no pure old growth lodgepole pine stands in the project area, there will be no old growth effects. Changes in dead wood habitats could effect this species; discussions are in the "Management Indicator Species" section.

Current and long-term connectivity between LOS is maintained by a system of connectivity corridors. With no action, no activities would occur within existing connectivity corridors; these corridors would continue to provide for the free movement of LOS associated species in the

short- to mid-term. In the long-term, corridors would remain high risk to insects and fire that could degrade or eliminate habitat. Under the proposed action, treatments in five units (Units 8, 9, 10, 23 and 25) would reduce canopy on 185 acres in established connectivity corridors. Thinning prescriptions would be adjusted to maintain canopy cover in the upper 1/3 of site potential as required by Regional Forester's Forest Plan Amendment #2. Prescribed underburning and pre-commercial thinning would reduce understory stocking; however, design requirements would retain non-thinned patches. Under the proposed action, connectivity corridors would continue to provide for the free movement of LOS associated species in the short to mid term. In the long-term, untreated corridors would remain high risk to insects and fire that could degrade or eliminate habitat.

All of the activities in Appendix C have been considered for their cumulative effects on old growth species. Past activities such as timber harvest, fire suppression, and wildfire have combined to create the current condition of habitat in the analysis area. HRV tables in the Silviculture Report reflect the effects of past activities on structural stage. As stated previously, OFMS is generally within HRV; OFSS is below HRV. Since 1993, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to a loss of mature and old growth forest. Future thinning and burning projects listed in Appendix C would design projects to meet this direction as well. Projects in warm dry and hot dry biophysical environments would likely shift stands towards historic conditions that tended to support OFSS habitats and species such as the white-headed woodpecker. The Forest's network of Dedicated Old Growth (DOGs) and Replacement Old Growth (ROGs) would maintain habitat for pine marten and pileated woodpeckers. In the short-term, the no action and proposed action alternatives would not contribute to cumulative losses of old growth habitat. In the mid- to long-term, the no action alternative would elevate the risk of a stand replacement fire that could eliminate existing OFMS and OFSS. In the mid- to long-term, the proposed action would contribute positively to cumulative effects by accelerating the development of old growth, and therefore, contributing positively toward the viability of species that use these habitats.

Elk Habitat Effectiveness: The project area is in big game summer range, and supports both elk and deer. Currently, the Habitat Effectiveness Index (HEI) for the Crane Creek subwatershed is 0.56, exceeding the Forest Plan standard of .40. Total cover is 37%, exceeding the Forest Plan standard of 20%. Satisfactory cover is at 7%, less than the Forest Plan standard of 12%. Marginal cover is at 30%, exceeding the Forest Plan standard of 5%. Open road density is at 3.7 miles of open road per square mile exceeding the Forest Plan of 3.2 miles per square mile.

The no action alternative would have little effect on habitat components in the short- to mid-term. The proposed action would cause the loss of some hiding and escape cover during and immediately after thinning and burning operations, although shrub cover needed for calving and fawning habitat would return in the short to mid-term. The moderately negative *potential* effects of removing lower-level trees currently providing elk and deer cover would be reduced by the design requirement to retain unthinned patches of dense trees throughout the project area. Conservation of adequate elk and deer cover is reflected by computer modeling of the overall subwatershed condition, which indicates that, immediately after treatment, satisfactory cover would remain at 7 percent (no change) and marginal cover, which is currently plentiful, would decrease by 3 percent to 27 percent. Total cover at 34% would remain above Forest Plan standards.

By 2015 when all proposed treatments would be completed and their effects would be apparent, satisfactory cover would improve from the current 7 percent to 20 percent, compared to a Forest Plan standard (minimum) of 12 percent; and marginal cover would correspondingly decrease from the current 28 percent to 24 percent, compared to a forest standard (minimum) of 5 percent. Thus, in 2015 a total of 44 percent of the subwatershed would be in combined satisfactory and marginal elk cover, compared to 50 percent under no action and a forest standard (minimum) of 20 percent. Changes reflect the reductions in cover due to unit treatment and the increases in cover in untreated stands due to tree growth.

The predicted index of overall habitat effectiveness (HEI) for elk summer range in the Crane Creek subwatershed in 2015, including cover, is 0.52, compared to 0.54 under no action and the forest standard (minimum) of 0.40. In the short-term big game distribution may change, but deer and elk populations would be expected to remain the same. In the mid to long term, habitat effectiveness would be expected to increase; deer and elk populations would remain the same with the Oregon Department of Wildlife and Fish adjusting annual hunting permits to meet population management objectives.

All of the activities in Appendix C have been considered for their cumulative effects on species that use dead wood habitats. Past timber harvest, road construction, and fire suppression, in the analysis area has affected the quantity, quality, and distribution of cover habitat. Road construction has increased road-related disturbance on big game animals and their habitats. Historic livestock grazing may have affected forage, but today's livestock grazing is considered compatible with big game use. Past activities are reflected in the HEI, cover and road density values described at the beginning of this section. Overall HEI, total cover and marginal cover meet Forest Plan standards; satisfactory cover does not meet standards.

Reasonably foreseeable future activities in the Crane Creek subwatershed with a potential to affect elk habitat include Buttermilk, Elk 16, Little Wet Bear, and Upper Crane prescribed burning and thinning projects. Although these projects have yet to be developed, design features would be expected to be similar to those in the 16 Road project. Effects would also be similar to those described for the 16 Road Project. Combined projects would improve forage quality and quantity for big game, while reducing cover habitat and increasing big game vulnerability. However, combined projects would be expected to maintain overall HEI at or above Forest Plan standards.

The Phoenix project is expected to close additional roads in the analysis area. When the beneficial effects of closing roads under the related Phoenix project are considered cumulatively with the 16 Road project, the predicted elk HEI value improves to 0.64 for the proposed action and 0.65 for the no action. Other ongoing and foreseeable actions, i.e., summer recreation, hunting, and firewood cutting would continue to occur in the area but are not expected to affect big game on the large scale. These actions may temporarily and in the short term affect individuals but are not expected to affect populations.

The combined effects of the 16 Road project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of big game species within the analysis area.

Wildlife Disturbance or Displacement: During project operations (logging, noncommercial thinning, machine work, burning) degrees of disturbance and displacement of wildlife are likely. Disturbance and displacement of wildlife away from forestry operations depends upon the season of the year and the tolerance of the species and individual. For example, big game would

more likely be disturbed and displaced further away for a longer period of time than a foraging hairy woodpecker. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level. The Forest Plan requires protection for raptors during the reproduction periods. Seasonal restrictions for nesting raptors would be applied in active territories for this project and other ongoing and future projects. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Seasonal restrictions are applied on a project by project basis as needed.

Threatened and Endangered Species: Table 10 lists status, habitat and effects to threatened and endangered species of the Malheur National Forest in the 16 Road project area. The project area includes habitat for Canada lynx and gray wolf.

Canada Lynx: The current condition of the 37,523-acre Glacier LAU, particularly near the project area, has been strongly influenced by large wildfires since 1989 that caused mixed effects on primary and secondary suitable lynx habitat. The no action alternative would have **no effect** on lynx or their habitat since no vegetation treatment would occur. The no action alternative would maintain the existing condition of the LAU in the short term. In the mid to long term, lynx habitat would continue to recover from the effects of wildfire.

The proposed action would thin or underburn 32 of 80 acres of non-lynx habitat within the LAU. These stands are in the warm dry biophysical environment and do not classify as a lynx plant association. The resulting partial removal of dense horizontal cover in this comparatively small area is a slightly negative short-term direct and cumulative effect; the retention of woody debris to forest standards and the expected shrub response from burning are slightly positive longer-term direct and cumulative effects.

Alternative 2 **may affect, but would not likely adversely affect (NLAA)** lynx or their habitat. The NLAA call is primarily made because the three stands proposed for treatment are within the boundary of the Glacier LAU. In reality, the effects to the Glacier LAU would be negligible (<<0.1% of the LAU). Treatment stands are not lynx habitat. Treatments would move the vegetation towards a natural and sustainable condition. The proposed treated units are located on the southern edge of the LAU, over one mile from lynx habitat. In addition, no fragmentation of any potential dispersal habitat is anticipated due to treatment prescriptions and maintenance of connectivity corridors between late and old structure stands. Because so few acres within the LAU would be treated, effects would be very similar to the no action alternative.

There would be no affects to lynx or their habitat by utilizing alternate snowmobile routes during project implementation. All routes, including alternate routes, are existing approved snowmobile routes that are part of the Forest trail system. All existing approved snowmobile routes were included in the Canada Lynx consultation. There would be no additional recreational use above and beyond that use estimated for any of the routes.

All of the activities in Appendix C have been considered for their cumulative effects on Canada lynx. LAUs are designated areas of sufficient size that provide preferred habitat types and features for lynx. Thus the Glacier LAU is appropriate to use as the cumulative effects area for lynx relative to the 16 Road project area. Major changes to the habitat available to lynx have occurred within the Glacier LAU since 1989. Wildfires have burned 26,149 acres (24.5%) of the Glacier LAU since 1989. Wildfires have burned 24,940 acres (~23.4 %) within lynx habitat There have been several small fires within the Glacier LAU that burned less than 1000 acres. The Snowshoe Fire burned 2,964 acres and the Sheep Mountain Fire burned 5174 acre, which are also in the Glacier LAU. Both of those fires occurred in 1990. The High Roberts Fire burned

8,855 acres and the Monument Fire burned 1,890 acres in the Glacier LAU. Both of them occurred in 2002. These wildfires have modified unsuitable, as well as primary and secondary lynx habitat in the Glacier LAU, including denning habitat and foraging habitat. Some denning habitat was burned up and some denning habitat has since been created by deadfall from unsalvaged stands. Likewise, some foraging habitat for hares and lynx was both lost and created as a result of the wildfires. Reforestation efforts also have contributed to the creation of foraging habitat for hares and lynx in the Glacier LAU.

As a result of the 2002 Monument wildfire, salvage logging, thinning, planting and decommissioning of roads are taking place in a portion of unsuitable habitat within the Glacier LAU. This action was deemed to have no effect on lynx, suitable lynx habitat, populations, or dispersal habitat (Monument Fire FEIS 2004). Salvage logging of 209 acres out of 8,825 acres of the 2002 High Roberts Fire will occur. No foraging or denning habitat for lynx was affected by this project (High Roberts Fire Salvage Decision Memo 2004).

No other reasonably foreseeable projects or effects to lynx habitat in the Glacier LAU are anticipated at this time. There may be four future vegetation treatment projects planned in the Crane Creek subwatershed , but they would be south of the Glacier LAU and would not affect lynx habitat.

The no action alternative has no direct or indirect effects; therefore, there would be no cumulative effects. The additional acres of non-habitat proposed for treatment under the 16 Road project would not contribute to loss of habitat or population viability of lynx.

Informal consultation on Canada lynx was initiated in April, 2005 with U.S. Fish and Wildlife Service (USFWS). Details and the status of the 16 Road Project was presented at several Level 1 Team meetings with USFWS in attendance. The Biological Evaluation/Assessment of Threatened, Endangered, Proposed, and Sensitive Wildlife Species was submitted and reviewed by USFWS in July, 2006.

Gray wolf: Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage big game populations, a primary prey species. The "Habitat Effectiveness for Elk" section describes effects to big game; existing populations would be maintained under both the proposed and no action alternatives. Habitat effectiveness would be expected to improve. No denning habitat for gray wolf is currently occupied in Oregon.

At this time, the determination for almost all project activities on the Malheur National Forest is **no effect** for the following reasons:

- No populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur National Forest.
- There is an abundance of prey on the forest; therefore, prey availability is not a limiting factor.
- Most management activities for non-breeding populations are compatible with wolf protection and recovery.

Because there are no direct or indirect effects to gray wolf, there would be no cumulative effects.

Sensitive Species: Table 11 lists status, habitat and effects to sensitive species of the Malheur National Forest in the 16 Road project area. The project area includes dispersal habitat for California wolverine.

Wolverines occur in a broad range of wilderness habitats. Source habitats for wolverine include alpine tundra and all subalpine and montane forests. Wolverines are typically opportunistic

predators and use a wide variety of foods including roots, berries, small and medium size rodents, birds, bird eggs, fish, and carrion (especially ungulate carcasses). Wolverine can attack elk, and deer hampered by deep snow. Regardless of habitat type used, the critical component to suitable source habitat seems to be the absence of human activity or development. High elevation wilderness and undisturbed backcountry refugia are still considered critical to the current welfare and viability of existing wolverine populations.

The project area has received heavy timber management and contains road densities not favorable for wolverine and other carnivores. There is no source habitat in the project area. The nearest source habitat is in the Monument Rock Wilderness located approximately eight miles to the north of the project area. There are no confirmed records of wolverine occurring in the project area.

Since there are no recorded sightings in the project area and the project area is not in source habitat, a **no impact** determination is given for both the no action and proposed action alternatives. The probability of wolverine occurring in the project area is low. The project area is most likely dispersal habitat for wolverine. Under the proposed action, the vegetation treatments would not convert timber stands to unsuitable corridor habitat for wolverines; therefore, no anticipated impacts to wolverine with this alternative would be expected. Because there are no direct or indirect effects to wolverine, there would be no cumulative effects.

Management Indicator Species (MIS): MIS are species selected by the Malheur National Forest as "barometers" of species diversity, viability, and the forest ecosystem. They are monitored over time to assess how changes in forest conditions (especially from management) affect MIS populations and habitat, and thus also populations of other species with similar habitat needs.

Pine marten, pileated woodpecker, and northern three-toed woodpecker represent both old growth habitats and dead wood habitats; effects are discussed here and in the "Late and Old (LOS) Structural Stages" section of this EA. Rocky Mountain elk represent big game species; effects are discussed in the "Elk Habitat Effectiveness" section. Primary cavity excavators (most woodpeckers) represent dead wood habitats; effects will be discussed in this section.

The Forest Plan identifies 11 Primary Cavity Excavators (PCE) as MIS for the availability and quality of dead and defective wood habitat: black-backed woodpecker, three-toed woodpecker, Lewis' woodpecker, white-headed woodpecker, pileated woodpecker, downy woodpecker, hairy woodpecker, northern flicker, Williamson's sapsucker, red-breasted sapsucker and yellow-bellied sapsucker. Because sapsucker species have been re-classified in recent years, the red-naped sapsucker will be used as a surrogate for the red-breasted and yellow-bellied sapsuckers.

On average, current snag densities in the Crane Creek subwatershed do not meet Forest Plan standards for 100% potential population levels, i.e., 2.39 snags per acre equal to or greater than 21" dbh. Existing snags average 3.1 snags per acre 10-20" dbh and 1.2 snags per acre 20"dbh and greater. Total snags may exceed the Forest Plan standard, but the large diameter snags 20" dbh and greater are deficient. Existing snag levels are, however, similar to densities reported in 1927 timber surveys conducted on the southern half of the Prairie City Ranger District. These surveys were conducted in vegetation similar to that found in the project area. Existing snags levels are primarily a result of past harvest which removed a large portion of the existing snags and large, mature trees (snag replacement trees).

Existing snag data was also compared to wildlife data in DecAID 2.0 (Mellen 2006). DecAID is an internet-based computer program developed as an advisory tool to help federal land managers

evaluate effects of management activities on wildlife species that use dead wood habitats. While DecAID provides data on wildlife use of snags and down wood, it does not measure the biological potential of wildlife populations. There is no direct relationship between wildlife tolerances, snag density and size used in DecAID and snag density and size that measure potential population levels (Mellen et al. 2006). This analysis focused on the wildlife inventory data in DecAID. Wildlife tolerance levels (30%, 50%, 80%) are used to describe the % of a population that utilizes a particular habitat characteristic (e.g., snag density). Essentially, the lower the tolerance level, the fewer individuals will likely use the area. For example, at the 30% tolerance level for any given species, it would be expected that 30% of a population would find suitable or usable habitat at the specified snag density. Consequently, 70% of a population would not find suitable habitat conditions at that snag density. It should not be assumed that the highest tolerance level (80%+) is always the goal for management. In many instances, historic conditions, particularly in the dry forest types, did not support the density of snags at the 80% level. In the Crane Creek subwatershed, existing snag levels for various PCE species correlate to the lower tolerances levels, primarily at the 30%-50% tolerance levels or lower. The 1927 local data (Matz 1927) suggest that historic conditions could only provide for dead wood conditions at these lower tolerance levels.

At the subwatershed level, down wood levels are assumed to meet or exceed Forest Plan standards in OFMS and YFMS stands and untreated stands, and to be below Forest Plan standards in early- and mid-successional stands and previously managed stands. In the project area, down logs are generally believed to be below Forest Plan standards, although levels may be higher on the north side of the 16 Road than on the south side.

Today, many green timber sales are conducted differently than they were in the past. In the 16 Road Project, snags would not be targeted for removal, although incidental snags may be lost during logging to meet operational/safety needs during logging. Project design criteria, such as retaining clumps of live trees around snags and locating landings and temporary roads where there are few or no snags, would help minimize losses. Retention of untreated patches of trees would continue to provide avenues for snag creation. Prescribed burning would be expected to have the most effects on snags. Snags can be both lost and recruited during burning. Design features would be incorporated into burn prescriptions to minimize the effects to existing snags. This “snag exchange” may increase local woodpecker viability if fire created snag recruitment exceeds loss. Because most of the mortality would be in trees smaller than 10” dbh, most of the benefits would be to foraging habitat rather than nesting habitat. The proposed action would result in the most immediate increase in foraging habitat. Under the no action, high tree stocking would continue to induce tree mortality. In the short-term, snag creation would likely be more gradual; however, a large bark beetle epidemic or wildfire could create a high number of snags quickly.

At the subwatershed level, the loss of snags from harvest would be expected to be minor due to the small area affected and the fact that snags would not be targeted for removal. Snags felled for safety during logging operations would impact 5%-10% of the existing snags in the treatment units, and less than 1% at the subwatershed level. The number of smaller snags (< 10” dbh) would increase as a result of applying prescribed fire treatments while the level of large snags would remain relatively unchanged. Although the analysis area is below Forest Plan standards, this additional level of impact would not be expected to adversely affect PCE populations in the analysis area. At the subwatershed scale, the levels of snags greater than 20” dbh would be expected to be similar to historic snag levels (Matz 1927). Forest Plan standards for green tree replacements would be met following treatments. Sufficient snag replacement trees would be

available to meet future needs in all treatment units. Although snag habitat would be expected to increase, DecAID tolerance levels would be expected to remain around the 30%-50% or lower, as described previously.

The no action alternative would not effect down wood in the short-term. Under the proposed action, burning activities would be conducted to ensure little or no net loss of down logs. Logs may be charred, but effects would meet Forest Plan standards that require that no more than 3 inches of the log diameter, 1.5 inches on either side of a log, be consumed. Although down logs are currently below Forest Plan standards, logs would be expect to increase as existing or created snags fall. Future down levels were projected into the future based on existing and projected snag levels and estimated fall down rates. Projected down wood levels would meet Forest Plan standard for both the no action and proposed action alternatives in the year 2025 and beyond.

Table 11 in this EA lists MIS for dead wood habitats including 10 PCE species and the pine marten. The table concludes that the no action alternative would have a neutral effect on most PCE habitats and therefore, no effect to populations. Only the red-naped sapsucker, Williamson's sapsucker, and downy woodpecker show a slight negative effect to habitat due to continued decline in aspen habitats. Deciduous habitats only comprise a small portion of the subwatershed, so no changes to existing populations would be expected. The pileated woodpecker and pine marten both show a slightly positive effect to habitat, but this is primarily due to expected increases in cover over time as described in the "Late and Old (LOS) Structural Stages" section.

Table 11 concludes that the proposed action would have positive effects on most PCE species because of the increase in snag habitat from prescribed burning and because of improvements in aspen habitats. Habitat increases would not be expected to change populations. Pileated woodpeckers and martens indicate a slightly negative impact to habitat. Snag habitat for pileated woodpeckers and martens would increase, but treatment would also degrade down log habitat and reduce cover. The proposed action would not affect populations of these two species. Effects to populations of these latter two species are described in the "Late and Old (LOS) Structural Stages" section of this EA.

All of the activities in Appendix C have been considered for their cumulative effects on species that use dead wood habitats. Past timber harvest, fire suppression, road construction, wildfire, and firewood cutting have impacted the quantity, quality, and distribution of deadwood habitats and PCE populations dependent on these habitat features across the analysis area. These activities have created the existing condition of dead wood habitats described previously. Large snags are currently below Forest Plan standards, but densities are similar to historic snag data reported by Matz in 1927. Existing down logs are also below Forest Plan standards.

Reasonably foreseeable future activities in the analysis area include the Buttermilk, Elk 16, Little Wet Bear and Upper Crane prescribed burning and thinning projects. The effects of these projects on snags and down wood habitat are expected to be similar to effects described for the 16 Road project. Harvest would fell only incidental snags for safety reasons and landing/temporary road construction. Future underburning activities have the potential to both consume existing snags and downed logs and to create new snags. Design features would be included to minimize consumption of existing habitat. Overall, snags and down logs would be expected to stay about the same or increase.

Additional road closures associated with the Phoenix project will occur in the project area and Crane Creek subwatershed over the next five years. An estimated 114 miles of road closure and

8 miles of road decommissioning will occur in the subwatershed. Fewer miles of open road and lower open-road densities would reduce access and the number of snags and future down woody material lost to firewood cutters.

Due to the low level of effect that is expected with the proposed action alternative on snag and down wood habitat, it is not expected that adverse cumulative effects on snag and downed wood habitat and the species that depend on these habitats would result when combined with the residual and anticipated effects of past, present, and reasonably foreseeable future activities.

Featured Species (MIS): Table 13 lists featured species that may be affected by the 16 Road project. The table summarizes habitat requirements and effects to habitat and populations. The following discussions will focus on blue grouse and northern goshawk. Mule deer is addressed in the "Habitat Effectiveness for Elk" section. Flammulated owl is addressed in the "Landbirds" section. Only goshawks nests have been identified in the project area; no other raptor nests have been located. If additional nests are found, appropriate nest protections and seasonal restrictions will be applied.

Blue Grouse: Blue grouse prefer coniferous forests with a mixture of deciduous trees and shrubs near edges, openings and meadows. They use large mistletoe infected Douglas-fir trees, generally located within the upper 1/3 of slopes, as winter roosts. The Forest Plan requires the maintenance of winter roost habitat. Winter roost habitat is present in the analysis area, generally in middle elevations north of the 16 Road. Due to the topography and stand structure south of the 16 Road, it is unlikely that these areas would provide winter roost habitat.

Under the no action alternative, there would be no direct, indirect or cumulative effects to winter roost habitat. Habitat conditions would remain in the short- to mid-term. Over the long-term, increased stand densities and related stress could result in increased mistletoe and therefore increased winter roost habitat. Under the proposed action, harvest of trees potentially providing winter roost habitat would occur. As directed by the Forest Plan, design features would be incorporated into harvest prescriptions to maintain winter roost habitat. Populations of blue grouse would be maintained under both the no action and proposed action alternatives.

All of the activities in Appendix C have been considered for their cumulative effects to goshawk and their habitats. Past harvest and thinning, fire suppression, wildfire, and personal use woodcutting have affected the quality and quantity of winter roost habitat in the analysis area. Past harvest and thinning reduced stand densities and in some cases selectively removed infected trees that would have otherwise provided potential winter roosting habitat. Past fire suppression has allowed the encroachment of shade tolerant tree species to invade fire-prone habitat types, increasing stand densities. Increased stand densities throughout the analysis area have increased stress, allowing for an increased incidence of insects and disease, including dwarf mistletoe. Mistletoe is likely elevated over historic levels. Past wildfire has also affected winter roost habitat for this species.

Reasonably foreseeable future projects with a potential to affect winter roost habitat for this species include Elk 16, Little Bear, Buttermilk, Upper Crane prescribed burning and thinning projects. Thinning of small diameter trees would reduce future stand densities, potentially reducing the incidence if disease agents, including dwarf mistletoe. Projects would be designed to meet Forest Plan standards for winter roost habitat.

Because design features would be included in all thinning and prescribed burning projects to help protect winter roost habitat, cumulative adverse effects would not be expected to reduce population viability of blue grouse.

Northern Goshawk: Goshawk is a species specifically identified in the Regional Forester's Eastside Forest Plans Amendment #2. They utilize a wide range of mature and immature forest habitat types. Breeding season habitat includes a nesting area, a post-fledging area (PFA), and a foraging area. In general, goshawks, nest in mature and old forest stands of relatively large trees with closed canopies (>50%) and an open understory. Goshawk surveys of potential habitat and historic nest sites were completed in the project area during the spring of 2005. One known goshawk territory, referred to as the Crane Creek PFA, occurs within and adjacent to the project area. Over the course of the last decade, four nests have been located within the Crane Prairie goshawk territory. The 2005 survey determined that one of the nests in the Crane Prairie territory was active and had nestlings.

Under the no action, habitat for northern goshawk would increase slightly as stand density and canopy cover increases. Populations would not be expected to change in the short- to mid-term, and could potentially increase in the long-term. Under the proposed action, there would be a slight reduction in habitat for the northern goshawk. Thinning and prescribed underburning is intended to reduce understory cover and open up stands, shifting stands towards historic conditions. About 142 acres of primary and secondary habitat would be treated, degrading habitat in the units treated. The acres affected would be considered incidental at the subwatershed level. Under both the no action and proposed action alternatives, primary and secondary habitat would remain plentiful; stand growth projections indicate habitat would increase in the mid-to long-term.

In the existing Crane Creek goshawk territory, no management activities would be conducted in the nest stand. Prescribed burning would occur in the PFA, but outside the nest core. Burning would create a mosaic of burned and unburned patches, increasing stand diversity and possibly prey diversity. Seasonal restrictions would be applied to burning in years the territory is active to avoid disturbance during the nesting period. The proposed action would not be expected to reduce goshawk populations.

All of the activities in Appendix C have been considered for their cumulative effects to goshawk and their habitats. Nesting habitat is typically the limiting factor for goshawks. Past timber harvest reduced mature and old growth habitat preferred for nesting and fledging. Since 1993, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to a loss of mature and old growth habitat. Forage is not considered a factor limiting goshawk population viability, and consequently, cumulative changes to foraging habitat, whether positive or negative, would not contribute to a measurable change in goshawk populations.

Goshawks are highly sensitive to disturbance during the breeding season. When seasonal restrictions on management activities were disregarded in the past, breeding success may have been reduced. Since 1990, seasonal restrictions on activities have been regularly used in the vicinity of occupied nests. Future thinning and burning projects listed in Appendix C would be designed to protect existing territories and avoid disturbance during the nesting season.

In the short-term, the no action and proposed action alternatives would not contribute to cumulative losses of old growth habitat, i.e., goshawk nesting habitat. In the mid- to long-term,

the no action alternative would elevate the risk of a stand replacement fire that could eliminate nesting and foraging habitat. In the mid- to long-term, the proposed action would contribute positively to cumulative effects by accelerating the development of old growth, Cumulatively, management actions would not be expected to reduce population viability.

Landbird Species including Neotropical Migratory Species:

Landbird discussions focus on effects on priority habitats described in the Northern Rocky Mountains Bird Conservation Plan (Altman 2000). Dry forest types, mesic forest types, riparian areas, and aspen habitats are the priority habitats found in the project area that could be affected by proposed treatments.

Under the no action, there would be no direct effects to species associated with OFSS in warm dry and hot dry biophysical environments. OFSS would remain below HRV, limiting habitat for landbirds that use this habitat type. Under the proposed action, treatments in warm dry biophysical environments would shift stands towards this historic condition. Following treatment, many stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover with scattered shrub cover and pine regeneration (Altman 2000). Development of OFSS would be delayed as described in the LOS section, but desired species would still be expected to respond favorably. MIS or priority landbirds that would directly benefit from this condition include the white-headed woodpecker, flammulated owl, chipping sparrow and Lewis' woodpecker. Design requirements would retain non-thinned patches for species such as the flammulated owl and chipping sparrow. Common flickers, pileated woodpeckers, Williamson's sapsucker, northern goshawks and hairy woodpeckers currently using young to mature ponderosa and mixed conifer stands would also be expected to continue using habitat in the project area.

Mesic mixed conifer habitats are limited in the project area. Under the proposed action, there would be minimal impacts to this habitat type; only 34 acres of commercial thinning is proposed. A very light thinning prescription would retain high canopy cover and multi-layered habitat features desired by such species as the varied thrush. Throughout the analysis area, suitable habitat would be maintained for associated landbird species such as the Townsend's warbler, MacGillivray's warbler, and olive-sided flycatcher. For both the no action and proposed action alternatives, populations of species that use this habitat type would be expected to persist.

Riparian woodland and shrub habitats comprise a small portion of the project area and analysis area. Habitat components are deficient due to past management activities including timber harvest, livestock grazing, deer and elk browsing, and fires suppression. Under the no action alternative, no activities would occur in the riparian areas. Shrub conditions would remain static or improve over time. Under the proposed action, limited treatments are proposed in riparian areas. Timber harvest units, landings and temporary roads would not be located in Riparian Habitat Conservation Areas (RHCAs). Restricting these activities to areas outside of RHCAs would prevent adverse impacts. Prescribed activities would occur in RHCAs. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. Some mortality of understory trees would occur in unburned patches, with only a few overstory trees being killed. Created small openings in the canopy may induce establishment of shrubs, grasses and forb species, benefiting such species as Lewis' woodpecker, red-eyed vireo, veery and willow flycatcher.

Under the no action alternative, aspen stands would continue to decline, to the detriment of species that use this habitat. Under the proposed action, aspen restoration treatments, which are

numerous and intensive yet not large in combined area coverage, would benefit by degrees all of the MIS, featured species, landbirds, or raptors studied in detail, and especially the Williamson's and red-naped sapsuckers, the northern flicker, and northern pygmy owl.

All of the activities in Appendix C have been considered for their cumulative effects to goshawk and their habitats. Every action (including no action) within the scope of control of the Forest Service has tradeoffs between various landbird species. Past actions, including timber harvest, livestock grazing, recreation development, road construction, and fire suppression, among others, have all impacted landbird species and habitats individually and cumulatively. Past timber harvest has caused a loss of mature, open stands of ponderosa pine throughout much of the analysis area. The quality and quantity of habitat for species dependent on these habitats has decreased. Road building associated with timber harvest has reduced the quantity of habitat available to some species and led to the fragmentation of habitat. Fire suppression over the last century has resulted in the encroachment of fire intolerant species (Douglas fir, grand fir, and lodgepole pine) into biophysical environments where these species were historically uncommon. Fire suppression has impacted residual pine stands by allowing fire-intolerant tree species to compete with ponderosa pine, and caused understories to become dense. Past harvest has reduced large snag habitats in mesic mixed conifer forests. Past grazing and fire suppression has reduced riparian shrub and aspen habitats.

Some species have benefited from past actions. Multi-layered habitats have increase due to fire suppression. Past fires and regeneration harvesting has created patches of burned old forest, and edge and opening habitat features. In dry forest habitats, past harvesting has created some open conditions that now have regenerating pines.

Proposed underburning in areas north and south of FS Road 16 and near Elk and Crane Creeks (all within project subwatershed) would affect neotropical migratory bird habitat and nesting success in the spring following burning due to losses in nest structure and ground cover. The timing of these underburns would generally avoid the breeding season for these species by burning early in the spring. Habitat for dry forest associated species of birds dependent on open grasslands and shrub habitats and a mosaic of burned and unburned conditions would benefit in the short term.

Livestock grazing in the uplands and along streams has also affected, and may still affect landbird habitat. Livestock grazing generally occurs after the majority of songbird breeding has occurred, but may impact late breeding individuals or species or individuals that are re-nesting after loosing their initial brood. Cattle may have caused shifts in species composition and abundance through selection of more palatable forage species. Cattle reduce ground cover through trampling or consuming vegetation, decreasing cover habitat for some ground nesting birds. Past grazing along and in stream corridors has also reduced riparian shrub habitat. The conditions of some riparian areas and aspen habitats has been improved by new management practices and restoration activities in more recent years, but some areas are still not fully restored to conditions that are most suitable for associated landbird species. In the last 10 years, stream restoration work including fencing of riparian areas in the analysis area has help improve riparian and aspen stand conditions. The Little Crane Creek and Crane Creek fencing projects, along with scattered aspen fencing projects have improved hardwood, shrub, and aspen habitat components in the Crane Creek subwatershed.

The no action alternative would not treat habitat in the analysis area. The habitats that currently exist within the project area would be maintained in the current condition, and provide for the species diversity, density, and distribution that currently exists in the short and mid term. In the

long term, open pine stands would continue to be lost through multi-strata canopy development in the absence of fire. This alternative would combine with past harvest and fire suppression to further reduce the abundance of these habitats within the analysis area. Considering the existing condition of these habitats within the analysis area, it appears likely that in the long term, without treatment, what suitable habitat that remains for dry forest dependent landbirds would be converted to unsuitable habitat, potentially affecting population and their distribution within the analysis area.

Cumulatively, the proposed action when combined with past, present and future project practices would not be expected to reduce viability of landbird species including neotropical migratory species; rather, proposed management activities would slightly improve species richness.

Wildlife Summaries: The following tables summarize and compare predicted effects on individual species and their habitat without action (Alternative 1) with predicted effects of the proposed action and its special features (Alternative 2). Generally, habitat calls reflect immediate or short-term effects whereas population calls reflect mid- to long-term effects. A "neutral" call does not necessarily indicate there are no effects; rather, the overall call may be a result of the combined effects of both positive and negative effects. Refer to the previous text sections for more detailed effects disclosure. The separate tables correspond to the previously discussed wildlife categories:

- Threatened, endangered or proposed species listed under the Endangered Species Act
- R6 sensitive species listed by the Regional Forester
- Management indicator species (MIS) of the Malheur NF
- Featured species of the Malheur NF, big game, primary excavators, and raptors (birds of prey)
- Priority migratory or resident landbirds identified through the Partners in Flight Program

Table 10. Status, habitat of and effects to threatened and endangered species of the Malheur National Forest in the 16 Road Forest Health project area

Species	Status	Habitat	Habitat or Species Present?	Effect of Alt. 1: No Action	Effect of Alt. 2: Proposed Action
Gray wolf *Canis lupus*	Endangered	Broad spectrum of habitats with abundant ungulate prey	Habitat and prey present. Species not documented.	No Effect	No Effect
Lynx *Felis lynx*	Threatened	Mixed conifer forests, lodgepole; deep snow, abundant hares and red squirrels	Habitat present. Species not documented.	No Effect	May Affect, Not Likely to Adversely Affect
Bald eagle *Haliaeetus leucocephalus*	Threatened	Large trees for nesting near fish bearing rivers and lakes	No habitat present. Species not documented.	No Effect	No Effect

Table 11. Habitat of, occurrence, and impacts to sensitive species of the Malheur National Forest in the 16 Road Forest Health project area

R6 Sensitive Species	Habitat Required	Habitat In Project Area?	Species Occurrence In or Near Project Area?	Impacts Determination, Alt. 1: No Action	Impacts Determination, Alt. 2: Proposed Action
Mammals					
Wolverine *Gulo gulo*	Wilderness; coniferous forests; riparian areas in winter	Project area is not in source habitat; it is most likely dispersal habitat	No	No impact	No impact
Fisher *Martes pennanti*	Dense, mesic forests; old growth and riparian areas	No	No	No impact	No impact
Pygmy Rabbit *Brachylagus idahoensis*	Sage brush and deep, soft soils	No	No	No impact	No impact
Birds					
Bufflehead *Bucephala albeola*	Tree cavities near lakes and ponds	No	No	No impact	No impact
Peregrine Falcon *Falco peregrinus*	Cliff habitat over 200 feet high with ledges suitable for nesting	No	No	No impact	No impact
Upland Sandpiper *Bartramia longicauda*	Grasslands	No	No	No impact	No impact

R6 Sensitive Species	Habitat Required	Habitat In Project Area?	Species Occurrence In or Near Project Area?	Impacts Determination, Alt. 1: No Action	Impacts Determination, Alt. 2: Proposed Action
Gray Flycatcher *Empidonax wrightii*	Pinyon juniper woodlands	No	No	No impact	No impact
Greater Sage Grouse *Centrocercus urophasianus*	Sage brush dominated habitat	No	No	No impact	No impact
Bobolink *Dolichonyx oryziorus*	Grasslands	No	No	No impact	No impact
Tricolored Blackbird *Agelaius tricolor*	Freshwater marshes	No	No	No impact	No impact

Table 12. Management indicator species and priority landbirds*, and effects to habitats and population trends by alternative

Management Indicator Species (Present or with habitat in the project area)	Habitat Requirements	Effects of Alt. 1: No Action		Effects of Alt. 2: Proposed Action	
		Habitat	Population Trend	Habitat	Population Trend
Elk	Forested mountains and meadows with grasses and forbs	Neutral	No Change	Neutral	No Change
Pine marten	Mature, mesic spruce and subalpine fir forests with closed canopies. Mature and old stands at high elevations	Slightly Positive	No Change	Slightly Negative	No Change
Pileated woodpecker	Extensive areas of dense coniferous forest with tall closed canopy and high basal area	Slightly Positive	No Change	Slightly Negative	No Change
Three-toed woodpecker	Mature and over-mature coniferous forests with dead and dying trees infested with insects	Neutral	No Change	Slightly Positive	No Change
Black-backed woodpecker	Mature, montane coniferous forests with abundant dead and dying fire-killed or insect infested trees	Neutral	No Change	Slightly Positive	No Change

Management Indicator Species (Present or with habitat in the project area)	Habitat Requirements	Effects of Alt. 1: No Action		Effects of Alt. 2: Proposed Action	
		Habitat	Population Trend	Habitat	Population Trend
White-headed woodpecker*	Dry Forest (ponderosa pine and ponderosa pine/Douglas-fir/grand fir) with open canopies and large patches of old forest with large trees and snags	Neutral	No Change	Slightly Positive	No Change
Lewis' woodpecker*	Dry Forest (ponderosa pine and ponderosa pine/Douglas-fir/grand fir with large snags and patches of burned old forest	Neutral	No Change	Positive	No Change
Red-naped sapsucker*	A variety of coniferous forest types with large trees, snags and aspen interspersed; riparian areas with a hardwood component	Slightly Negative	No Change	Slightly Positive	No Change
Williamson's sapsucker*	Dense stands of large mixed conifers and ponderosa pine forests commonly mixed with aspen	Slightly Negative	No Change	Slightly Positive	No Change
Downy woodpecker	Open coniferous forests with aspen and open deciduous forests with conifers	Slightly Negative	No Change	Slightly Positive	No Change
Hairy woodpecker	Habitat generalist that prefers open stands with low basal areas along ridges, low slopes and southerly aspects in ponderosa pine and mixed conifer forests	Neutral	No Change	Slightly Positive	No Change
Northern flicker*	Habitat generalist that prefers large trees in open park-like stands adjacent to meadows	Neutral	No Change	Slightly Positive	No Change

*These species are also priority landbirds

Table 13. Featured species, big game, primary excavators and raptors, and effects to habitats and population trends by alternative

Featured Species, Blue Grouse, Big Game, or Raptors (Present or with habitat in the project area)	Habitat Requirements	Effects of Alt. 1: No Action		Effects of Alt. 2: Proposed Action	
		Habitat	Population Trend	Habitat	Population Trend
Blue grouse (Featured spp.) *Dendragapus obscurus*	Breeds at lower elevations in open stands of aspen or conifers with brush understory	Neutral	No Change	Neutral	No Change
Northern goshawk (Featured spp.) *Accipiter gentiles*	Large tracts of mature, closed canopy forests with an open understory	Slightly positive	No Change	Slightly Negative	No Change
Mule deer (*Odocoileu hemionus*)	Forested and open mountains and foothills with shrubs and grasses	Neutral	No Change	Neutral	No Change
Red-tailed hawk *(Buteo jamaicensis)*	Prefers open pasture, fields, meadows, swamps interspersed with coniferous or deciduous forests	Neutral	No Change	Neutral	No Change
American kestrel *(Falco sparverius)*	Open country with low vegetation and large trees for nesting	Neutral	No Change	Neutral	No Change
Cooper's hawk *Accipiter cooperii*	30 – 70 year old stands of coniferous or deciduous woodlands with shrubs	Neutral	No Change	Neutral	No Change
Sharp-shinned hawk *Accipiter striatus*	25 – 50 year old, dense, coniferous and mixed conifer aspen forests with shrubs in proximity to streams or ponds	Neutral	No Change	Neutral	No Change
Great gray owl *Strix nebulosa*	Mixed coniferous forests bordering small openings	Neutral	No Change	Slightly Positive	No Change
Great horned owl *Bubo virinianus*	Wide variety of forested habitats	Neutral	No Change	Slightly Positive	No Change
Northern saw-whet owl *Aegolius acadicus*	Dense conifer, mixed conifer or deciduous woods	Neutral	No Change	Slightly Positive	No Change
Northern pygmy owl *Glaucidium gnoma*	Deciduous, coniferous and mixed forests of dense pine or open areas with scattered trees	Neutral	No Change	Slightly Positive	No Change

*This species is also a priority landbird

Table 14. Additional priority landbirds and effects to habitats and population trends by alternative

Additional Priority Landbird Species (Present or with habitat in the project area)	Habitat Requirements	Effects of Alt. 1: No Action		Effects of Alt. 2: Proposed Action	
		Habitat	Population Trend	Habitat	Population Trend
Flammulated owl*	Dry forest types; old forest with interspersion of grassy openings and dense thickets	Neutral	No Change	Slightly Positive	No Change
Chipping sparrow	Dry forest types; open understory with regenerating pines	Neutral	No Change	Slightly Positive	No Change
Townsend's warbler	Mesic (moist) mixed conifer types; overstory canopy closure	Neutral	No Change	Neutral	No Change
Varied thrush	Mesic (moist) mixed conifer types; structurally diverse, multi-layered	Neutral	No Change	Neutral	No Change
MacGillivary's warbler	Mesic (moist) mixed conifer types; dense shrub layer in forest openings or understory	Neutral	No Change	Neutral	No Change
Olive-sided flycatcher	Mesic (moist) mixed conifer types; edges and openings created by wildfire	Neutral	No Change	Neutral	No Change
Red-eyed vireo	Riparian woodland types; canopy foliage and structure	Neutral	No Change	Neutral	No Change
Veery	Riparian woodland types; understory foliage and structure	Neutral	No Change	Neutral	No Change
Willow flycatcher	Riparian shrub types; willow or alder patches	Neutral	No Change	Neutral	No Change

*This species is also a raptor

All proposed activities and their predicted effects are consistent with wildlife standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies. Regarding lynx conservation under the Endangered Species Act in particular, the proposed action is consistent with requirements for projects proposed within or adjacent to Lynx Analysis Units and complies with the lynx project-design criteria used in the Blue Mountain Province. The proposed action does not modify lynx suitable habitat in the Glacier LAU.

All direct, indirect, and cumulative adverse effects of the proposed action on the affected wildlife resource are considered nonsignificant as proposed. This is due to: 1) some species of concern or their habitat not being present in the area; 2) the proposed action being designed to change forest conditions toward those more favored by many species that are present; or 3) the proposed action being designed to adequately retain or reproduce current conditions favored by certain other species that are present.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on wildlife can be found in "Biological Evaluation/Assessment of Threatened, Endangered, Proposed, and Sensitive Species (Oechsner, Stucliffe, Schuetz, 2006)," and "Terrestrial Wildlife Report (Oechsner, Bush, Schuetz, 2006)," located in the project record.

Fisheries and Amphibians

Fisheries and amphibians are important components of the affected human environment, because the general public places high value on aquatic animals and their habitat, and has expressed these values through many public laws, regulations, and policies that pertain to the project. External review and comments on the proposal confirmed these values.

Aquatic animal species or habitats to be protected under the Endangered Species Act are those listed by the U.S. Fish and Wildlife Service as threatened, endangered, or proposed for federal listing. Species whose population viability is a current concern are listed as sensitive by the Regional Forester, Pacific Northwest Region (R6) of the Forest Service. Management indicator species (MIS) are those selected by the Malheur National Forest as "barometers" of species diversity, viability, and the forest ecosystem. They are monitored over time to assess how changes in forest conditions (especially from management) affect MIS populations and habitat, and thus also populations of other species with similar habitat needs.

Taken together, these applicable categories comprise nine separate species or habitats, some of which are listed in more than one category. Of the nine, three are known to occur in or have habitat in the project area, or are otherwise potentially affected by proposed activities, as shown in Table 15.

Conserving these three occurring species and their habitats—bull trout, interior redband trout, and Columbia spotted frog—is considered to provide a desirable balance of habitat conditions for all relevant aquatic species, including others that may occur in the area but which are not listed in any special management category.

Bull trout are present in Crane Creek along the southern boundary of, and directly downstream from, the project area; in Little Crane Creek directly east of the project area; and in the North Fork Malheur River downstream from the project area. Fall spawning habitat is present in Little

Crane Creek. The North Fork Malheur River also serves as a migration corridor for bull trout that utilize Beulah Reservoir for winter rearing habitat.

Table 15. Occurrence of aquatic threatened, endangered, proposed, sensitive, or management indicator species of the Malheur National Forest in the 16 Road Forest Health project planning area or affected watersheds

Species	Status	Present in Planning Area	Present in Watershed
Bull trout (*Salvelinus confluentus*)	Threatened*	Yes	Yes
Summer steelhead trout (*Oncorhynchus mykiss*)	Threatened*	No	No
Steelhead trout critical habitat	Proposed	No	No
Essential Fish Habitat (EFH)	Designated	No	No
Malheur mottled sculpin (*Cottus bendirei*)	Sensitive	No	No
Spring chinook salmon (mid-Col. R. ESU) (*Oncorhynchus tshawytscha*)	Sensitive	No	No
Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)	Sensitive*	No	No
Interior redband trout (*Oncorhynchus mykiss*)	Sensitive*	Yes	Yes
Columbia spotted frog1 (*Rana luteiventris*)	Sensitive	Yes	Yes

1 Federal candidate species for listing under the ESA.
* These species are also management indicator species (MIS) of the Malheur National Forest

Interior redband trout are present in Halfway Creek and Crane Creek, within and downstream from the project area. Redband trout spawn in the spring.

Crane Creek and Halfway Creek—the two streams most directly associated with the project proposal and its fisheries concerns—were surveyed from April 28 to May 2, 2005, to measure current physical conditions including streambed particle-size composition, width-to-depth ratios, water temperature, and frequencies of large woody debris and pools. Conditions measured by these surveys can be compared to Riparian Management Objectives (RMOs) provided by the current Forest Service policy called "INFISH," which stands for Interim Strategies for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, western Montana and portions of Nevada. For streams such as Crane Creek and Halfway Creek, the RMO for large woody debris (LWD) is to maintain at least 20 pieces of LWD (12 inches in diameter and 35 feet long) per stream mile. The 2005 surveys showed that, in both of the reaches (segments) of Crane Creek that were surveyed, current levels of LWD are below the INFISH objective. In Halfway Creek, the LWD objective was exceeded (met) in one of the surveyed reaches and was slightly below in the other. Large woody debris is valued because it forms pools and contributes other important qualities to trout habitat.

The analysis of effects to fish species and their habitat that would occur under each alternative is focused on the following environmental factors for streams or streamside areas:

- Sediment
- Large woody debris
- Temperature and shade
- Water yield
- Wildfire risk

Columbia spotted frogs are highly aquatic and rarely found far from permanent water. They live in spring seeps, meadows, marshes, ponds and streams, usually where there is abundant vegetation. They often migrate along riparian corridors between habitats used for spring breeding, summer foraging, and winter hibernation—for which migration may begin as early as September. Springs, cutbanks and willow roots are important elements of hibernation habitat.

The analysis of effects to spotted frogs and their habitat that would occur under each alternative is focused on any changes to wet or flooded areas and closely connected riparian habitat.

Fisheries and Amphibians Design Features, Conservation Measures, and Monitoring Requirements

Special features of the proposed action directly applicable to conservation of fisheries and amphibians are all of those listed in previous sections titled "Integrated Features Involving Roads—General to All Components of the Human Environment and Soil and Water Design Features, Conservation Measures, and Monitoring Requirements." Additionally, the following design feature from the Forest Fire Hazards section directly applies:

- Firelines needed to conduct the proposed treatments shall consist of natural breaks, existing roads, or hand-constructed lines. Hand-constructed firelines may be used to keep fire out of sensitive areas such as historic sites or private property.

The emphases of the above-referenced special features applicable to fisheries and amphibians can be summarized as follows: 1) To limit soil-surface disturbance especially near streams, 2) To avoid or control sediment transport to watercourses, 3) To conserve native vegetation and large woody debris in streamside or other riparian areas (Riparian Habitat Conservation Areas—RHCAs), and 4) To maintain streamflows to within normal seasonal ranges.

Effects of the Alternatives

Detailed consideration of effects was focused on the three species from the applicable categories of aquatic animals that are known to occur in or have habitat in the project area, or are otherwise potentially affected by proposed activities: bull trout, interior redband trout, and Columbia spotted frog. Avoiding significant adverse effects on these species and their habitats is considered to avoid significant adverse effects on all aquatic animal species potentially affected by the proposed action.

Direct & Indirect Effects

If no action is taken, there would be no adverse effects to bull trout, redband trout or their habitats from sedimentation, loss of large woody debris, loss of shade, water-temperature increases, or water-yield increases, because there is no appreciable source of these problems currently operating in the project environment. The current, lower-than-desired level of large woody debris in some stream reaches, particularly in Crane Creek, would not be made worse by "no action," and may theoretically improve in the long run from trees near streams growing large

and eventually falling into channels. Spotted frogs, in the absence of the proposed action, would also continue to be supported by existing habitat and not suffer any direct adverse effects.

In the event of a large wildfire, however, current forest conditions left untreated reflect potential for uncharacteristic, very high-intensity fire behavior and potentially severe, short-term impacts to soils and water quality, as discussed in earlier sections of this report. In such an event, the likely indirect or secondary short-term impacts to bull trout or redband trout habitat in Crane, Little Crane, Halfway creeks or downstream would include increased sediment transport to streams, sediment effects on channel qualities and spawning habitat, ashflow, loss of streamside shade in turn causing higher summer water temperatures which are a particular concern for bull trout, increased water yield elevating nutrient and sediment loads, and decreased large woody debris. A large, high-intensity wildfire would very likely impact (kill) individual spotted frogs but would not imply major impacts to their habitat, as it consists mainly of spring seeps, meadows, marshes, ponds, streams and associated wet-site low vegetation that would likely only be minimally and temporarily affected by fire.

By comparison, the proposed action is also very unlikely to cause direct adverse effects to bull trout or redband trout, and at most only minor (indeterminable) indirect adverse effects to their habitats from sedimentation, loss of large woody debris, loss of shade, water-temperature increases, or water-yield increases. This is because no in-stream activities are planned and the required design features, conservation measures, and monitoring would very likely cause any indirect adverse effects to be avoided or controlled to very low, inconsequential levels.

The winter harvest requirement, RHCA buffers, and related restrictions will minimize soil-surface disturbance and protect trout streams from receiving any appreciable, added sediment from logging, limited road work, or related activities. Prescribed burns that may be allowed to back or creep from treatment units into riparian areas will be planned, scheduled and controlled to retain beneficial duff or other ground cover to meet forest standards. Temporary (about one year) minor increases in sediment reaching streams from limited burning in RHCAs are possible, yet unlikely to cause any measurable change to current trout habitat. No change in large woody debris in or near streams is expected, nor any reduction of streamside shade that could result in higher water temperatures, because no trees would be harvested within 300 feet of perennial streams or within 100 feet of intermittent streams. Concerning water yield: Removing trees or other vegetation in treatment units would not measurably increase flows in Crane, Little Crane, or Halfway creeks due the small size of the project in relation to the larger watershed and the limited reduction of tree-canopy coverage planned; thus, water yield from the area would not elevate stream nutrient or sediment loads that could affect trout habitat.

As detailed in earlier sections of this report, the proposed action appreciably reduces potential fire intensity, resistance to control, and the risk of severe of impacts to forest vegetation, soil, and water from a possible future large fire burning in the area. Consequently, the proposed action appreciably reduces the risk of secondary, short-term fire impacts to bull trout or redband trout habitat that could occur if no action is taken (these impacts are described in a preceding paragraph).

Limited burning in riparian areas under the proposed action may kill individual Columbia spotted frogs and cause the temporary loss of some spotted frog riparian habitat. These possible impacts are considered minimal, however, because most spotted frog life cycles, including breeding, occur in wet or flooded areas. Therefore, it is unlikely that these potential impacts would reduce the viability of Columbia spotted frog populations on the Malheur National Forest.

All proposed activities and their predicted effects are consistent with relevant aquatic and related habitat standards of the Forest Plan and its associated amendments including INFISH and the requirements of other applicable laws, regulations, and policies. Regarding bull trout conservation under the Endangered Species Act in particular, the proposed action is consistent with requirements for projects proposed within or adjacent to bull trout habitat and complies with the specific bull trout project-design criteria used in the Malheur River Basin.

All direct and indirect adverse effects of the proposed action on fisheries, amphibians, and their habitats are considered nonsignificant as proposed.

Informal consultation on bull trout was initiated in April, 2005 with U.S. Fish and Wildlife Service (USFWS). The 16 Road Project was discussed at several Level 1 Team meetings held during 2005 and 2006, with USFWS in attendance. The Biological Assessment/Biological Evaluation Fisheries Report was submitted to USFWS for review in July, 2006.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on fisheries and amphibians is the 29,388-acre Crane Creek subwatershed. This is the smallest area that can be described to encompass the project area and still contain the effects to watershed resources. Furthermore, the area is not so large that project effects are diluted with large areas of unmanaged or undisturbed land. Based on the analysis of direct and indirect effects, possible minor sediment delivery from prescribed burning is identified as the only potential effect of the proposed action that could incrementally impact the species or habitats analyzed, when considered collectively with other related actions. Thus, the analysis focuses mainly on the possibility of sediment-related cumulative impacts to the stream habitat of bull trout or interior redband trout.

Related actions relevant to the analysis are the past, present, and reasonably foreseeable future actions noted and described in Appendix C. Prominent among these for their influence on current sediment delivery are past timber harvests and associated road construction, large wildfires, and near-future road closures or road removals of the Phoenix project.

Sediment delivery as a potential cumulative effect was considered by referring to the soil and water cumulative effects analysis, which employed the Equivalent Roaded Acres (ERA) method. This method involves a threshold level of disturbed acres for the Crane Creek subwatershed, at or near which serious watershed impacts could be expected. As shown in Table 7, the immediate effect of adding the proposed action to the current condition is a 0.8-percent increase in the total subwatershed ERA, owing to added disturbance in the short term. While the resulting ERA total of 12.7 percent remains well below the threshold of 17 percent, the added disturbance is still a theoretical factor for potential sediment delivery to streams. The required design features, conservation measures, and monitoring of the proposed action, however, would very likely keep most newly disturbed areas from causing any sediment increases in streams.

Only minor, temporary sediment increases from limited burning in riparian areas are seen as possible. As these may be too small to measure, and the current ERA is well below the threshold, the potential of the proposed action to incrementally increase stream sedimentation is considered inconsequential as a possible negative impact to trout habitat in the Crane Creek subwatershed. Over time (as soon as five years after completion of the proposed action), ERA declines to below the current level due to ongoing recovery of areas disturbed by past actions, wildfires, or the proposed action, and the future beneficial effects of closing or decommissioning

roads under the Phoenix project. This declining ERA implies an increasingly stable watershed condition and maintenance of habitat conditions favorable for bull trout and interior redband trout.

All predicted cumulative effects of the proposed action are consistent with relevant aquatic and related habitat standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All cumulative adverse effects of the proposed action on fisheries, amphibians, and their habitats are considered nonsignificant as proposed.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on fisheries and amphibians can be found in "Biological Assessment/Biological Evaluation—Fisheries Report (Vanosdall, 2006)," located in the project record. The report includes additional rationale for effects determinations for threatened bull trout and sensitive redband trout and Columbia spotted frog.

Noxious Weeds (Invasive Plants)

Noxious weeds are invasive plants that can colonize disturbed areas such as may occur with this project and crowd out native plants and animals. They are an important component of the affected human environment because they have potential to reduce various resource qualities or public benefits desired from the area.

Invasive plant species occurring in the Malheur National Forest and Prairie City Ranger District are: houndstongue (*Cynoglossum officinale*), spotted and diffuse knapweeds (*Centaurea* sp.), Canada thistle (*Cirsium arvense*), dalmation toadflax (*Linaria dalmatica*), and whitetop (*Cardaria draba*). Four noxious weed species have been identified in five separate locations in the project area. Dalmation toadflax, Canada thistle, Houndstongue, and Diffuse knapweed (C. Howe , Malheur National Forest Range Technician, 2005, 16 Road Botanical Survey, September 30, 2005). All sites are located along roadways within the project. All infestations observed are less than 1 acre combined. Species known to occur along highways and roadsides accessing the project area are Canada thistle, knapweeds, houndstongue and dalmation toadflax. These areas can be vectors for the spread of weeds into other areas in the Malheur National Forest.

The analysis of changes to invasive plant conditions that would occur under each alternative is focused on the following environmental factors:

- Current weed infestations
- Potential for new weed establishment
- Weed monitoring and control

Invasive Plants Design Features, Conservation Measures, and Monitoring Requirements

The proposed action involves the following invasive-plants special features:

- Invasive-plant surveys would be done 1 to 5 years after the project on all open and closed system and temporary roads affected by the project activities.

- Heavy equipment would be cleaned prior to coming on National Forest System Lands. Specifically, equipment used within known locations of invasive-plant infestations should be cleaned prior to moving to another site within the forest or area treated last.
- Seed, straw, and other materials used for road decommission and erosion control would be certified weed-free.
- Use only gravel, fill, sand, and rock that are judged to be weed-free by District weed specialists if needed for project.
- All disturbed roads, landings, and skid trails would be seeded with a native seed mix after activities occur.
- Native plant materials are required for revegetation unless accepted extenuating circumstances are identified. See Standard # 13 in Record of Decision—Pacific Northwest Region Final EIS for the Invasive Plant Program, 2005.
- Invasive-plant inventory and monitoring should be done annually for 3 to 5 year post-project on all open and closed system and temporary roads affected by the project activities.

Effects of the Alternatives

Direct & Indirect Effects

If no action is taken, the relatively small populations of weeds in the area are not likely to increase appreciably in either the short or long term, because no additional disturbance is planned in that area and current monitoring and control measures would continue. Various current human activities in the general area—hunting, grazing, firewood cutting, and other uses of the forest—could, however, contribute to the spread of weeds. But this potential would be limited by virtue of the low level of new disturbances such activities would cause and the fact that Forest Service monitoring and control measures will continue. The exception to this analysis is in the event of a large wildfire, which in the absence of the proposed action would likely burn with very high intensity and resist control. Consequently, mineral soil could be exposed throughout the immediate and surrounding areas, creating favorable conditions for widespread weed establishment in the short or near term.

By comparison, the proposed action presents some limited potential for a short-term increase in invasive plants, and carries with it a possibility of introducing new invasive plant species to the area. Activities such as logging and burning would increase vehicle and equipment access into various areas and disturb portions of the soil surface. Invasive plant seeds or parts from along existing access roads may be transported into these areas, resulting in some new weed establishment. The potential is limited, however, because there are only five small presently known noxious weed sites, the winter-logging requirement will limit disturbance, and the other weed-prevention and control measures prescribed in the design features are likely to be effective. Prescribed burning, too, can result in some increase in invasive plant populations (Maret and Wilson 2000, and Briese 1996). Burned areas provide nutrients and space for invasive plants to establish. A monitoring study done in the Malheur National Forest, however, noted that an increase in invasive plants was closely related to the intensity of a fire; lower intensity fires, such as what is prescribed in this case, had fewer weeds develop on the site (Kerns et al. 2006). Additionally, soil- and weed-related special features of the proposed action will serve to limit, if not prevent, short-term weed establishment and control any longer-term adverse effects. Because the proposed action would substantially reduce current potential wildfire behavior and resistance to control, it correspondingly reduces the potential for a large fire to create favorable weed habitat (exposed mineral soil) over large areas.

All proposed activities and their predicted effects are consistent with invasive plant-related standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All direct and indirect adverse effects of the proposed action on invasive plants are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on invasive plants is the project area and associated access roads, because roads can serve as corridors for transport of invasive plant seeds or parts. Related actions most relevant to the analysis are past timber harvests and associated road construction in or near the project area (nearly all of which occurred prior to 1995), and near-future road closures or road removals of the Phoenix project in or near the area.

Past and ongoing projects have more than likely increased invasive plant populations within the project area, although only one small weed infestation is currently known and inventoried, and it is just outside the project boundary. The Malheur National Forest has a weed management program consisting of annual surveys combined with mechanical and hand-pulling treatments that serves to keep weeds from past actions in check. Invasive plants may increase in the short term as a result of the proposed project activities. Post-project surveys of the area annually for 3 to 5 years, however, will provide for early detection and treatment. Implementation of all required prevention and monitoring measures is likely to keep weed populations in the area low, as they are currently, for the long term. Additionally, completion of road closures or removals under the Phoenix project will further reduce the potential for weed seeds or parts being transported within or around the area, thereby offsetting to some degree any cumulative effect of the proposed action. Thus, the incremental impact of the proposed action does not cause the overall weed problem to approach a threshold of significance, because the current weed condition from all causes amounts to a low, probably declining impact, and the added impact of the proposed action is also limited and controlled in both the short and long term.

All predicted cumulative effects of the proposed action are consistent with noxious weed-related standards of the Forest Plan, including Forest plan modifications made by the Pacific Northwest Invasive Plan Program FEIS, and the requirements of other applicable laws, regulations, and policies.

All cumulative adverse effects of the proposed action on noxious weed conditions are considered nonsignificant as proposed.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on noxious weeds can be found in “Range Resource/Noxious Weeds Specialist Report (Laufmann and McArthur, 2006),” located in the project record.

Sensitive Plants

This section deals exclusively with potentially affected native plant species or their habitats that are currently listed as sensitive by the Regional Forester, USDA Forest Service—Pacific Northwest Region. All other relevant components of the human environment that involve vegetation or vegetation-related qualities are addressed in separate sections of this report.

Sensitive plant species are those whose population viability is a current concern. Public policies concerning them are provided to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native species or to a trend toward federal listing under the Endangered Species Act (ESA). (No plant species or plant habitats currently listed by the U.S. Fish and Wildlife Service as threatened, endangered, or proposed for federal listing under the ESA occur in or near the project area.)

The project area contains potential habitat of 18 of the 25 listed sensitive plant species of the Malheur National Forest. The approach used to design the project was to avoid or control actions within sensitive-plant potential habitat that could aversely affect the habitat or any individual plants or plant communities that might occur there. Project-area surveys completed in 2005 found no individuals or communities of any of these 18 species within their respective potential habitats, or anywhere else in the project area; still, all special design features provided for sensitive plants apply.

Sensitive Plants Design Features, Conservation Measures, and Monitoring Requirements

Special features of the proposed action directly applicable to conservation of sensitive plants include the following:

- Those pertaining to riparian areas (or RHCAs) listed in the previous section titled “Soil and Water.” These provide for establishment and protection of riparian habitat that coincides with potential habitats of various sensitive plant species.
- All of the special features listed in the “Noxious Weeds” section. These are provided to prevent weed establishment or expansion that could invade sensitive plant habitat.

Additionally, the following features specific to sensitive plants apply:

- Pre-implementation plant surveys will be conducted by qualified personnel under the supervision of the district botanist (Forest Plan Forest-wide Standard # 66).
- If sensitive plants are found in areas where ground-disturbing activities are proposed, these areas will be flagged and avoided.
- If sensitive plants are found in areas where prescribed burning is proposed, the district botanist and the Biological Evaluation will be consulted concerning fire adaptation of species involved. If burning is approved as a result, the consultation will include specifying the allowable burn period(s).
- Sensitive plant populations in burned areas will be monitored annually for 1 to 3 years following treatment.
- If sensitive plants are found within grazing allotments, and populations are in habitats that are negatively impacted by grazing, these areas should be protected with fencing.

Effects of the Alternatives

The analysis of effects to sensitive plants or their habitat that would occur under each alternative is focused on the following environmental factors:

- Mechanized disturbance
- Prescribed fire

Direct & Indirect Effects

If no action is taken, direct effects to sensitive-plant habitats, individual plants, or plant communities are very unlikely, because there are no appreciable sources of mechanized disturbance or prescribed fire currently operating in the project environment. Potential indirect adverse effects from a possible future wildfire were not analyzed in depth because none of the plant species of concern was found in surveys of the area and detailed information concerning fire effects on some of them is incomplete or lacking. It is known, however, that a very high-intensity large wildfire, for which there is potential in the absence of the proposed action, could burn through most, if not all, of the potential sensitive-plant habitats in the project area. Furthermore, it is considered that such a fire would have the potential to kill individual or small communities of sensitive plants that may occur, from excessive soil heating or substantial changes to microenvironments typifying various habitats. These immediate or short-term impacts would vary according to individual species and their sensitivities to intense fire. For example, habitat required by the orchid called clustered lady's-slipper *(Cypripedium fasciculatum)* would very likely be adversely affected by high-intensity wildfire, while effects on other species might be less or unknown. The longer-term implications of an intense wildfire for the population viability of any listed species are minimal, however, because it does not appear that important populations of these species occur in the area. Additionally, some of the species of concern are known to re-establish in severely burned areas over time.

By comparison, the proposed action involves the possibility of short-term effects to sensitive-plant habitats, individual plants, or plant communities, mainly in relation to prescribed burning. Adverse effects from mechanized disturbance factors (logging, limited road work, machine work) would be largely avoided by virtue of the integrated design features, conservation measures, and monitoring requirements. These effectively remove mechanized disturbances from, or restrict them within, any potential habitats or plant occurrences that may be found. For example, pre-implementation plant surveys (possibly leading to additional restriction areas), winter harvest, RHCA buffers, and intensive weed management practices will essentially prevent direct disturbance of any sensitive plants that might occur in upland areas, avoid riparian habitat altogether, and keep any competition from non-native plants to a low level. Prescribed burning, however, which is planned for most upland areas and may be allowed to creep at low intensity back into riparian areas that are not otherwise treated, is more of a factor for possible limited effects. For example, potential habitat exists in riparian areas for six species of the genus *Botrychium*, commonly called moonworts or grapeferns, and an orchid called northern twayblade *(Listera borealis)*. These are small, moisture-sensitive plants that can be present but not always evident above ground in a given year and very possibly go undetected in surveys. Partial burning of riparian areas at low intensity could temporarily alter portions of the *Botrychium* or *Listera* potential habitat and actually injure individual plants or reproductive parts that may be present above ground. Prescribed fire is not likely, however, to injure any of these plants beyond one season, due to their occurrence in moist areas and their underground support systems that would not be damaged by such fire activity. Other plants such as *Carex* species (sedges) that might occur without detection or be found in pre-implementation surveys could also experience limited effects from prescribed burning, mainly in spring as opposed to fall. The required consultations of the district botanist and Biological Evaluation, however, will ensure that any burning potentially affecting these plants is approved and conducted only under conditions that will avoid serious adverse effects. Finally, some sensitive-plant habitats, individual plants, or plant communities that may occur in the area would experience beneficial effects from the proposed action, due to favorable associations with low-intensity fire or aspen stands, both of which are featured.

Table 15 summarizes and compares predicted effects on individual sensitive plant species and their habitats without action (Alternative 1) with predicted effects of the proposed action and its special features (Alternative 2).

All proposed activities and their predicted effects are consistent with sensitive-plant standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All direct and indirect adverse effects of the proposed action on the sensitive-plant resource are considered nonsignificant as proposed. This is due to: 1) some species of concern or their potential habitat not being present in the area; 2) the proposed action being designed to avoid changing the habitat of most species whose potential habitat occurs in the area; 3) the proposed action being designed to change forest conditions toward those more favored by certain species whose potential habitat is present; or 4) the proposed action being designed to limit or control possible adverse effects to certain other species whose potential habitat is present.

Table 16. Summary of effects determinations for sensitive plant species with habitat in or near the 16 Road Forest Health Project.

Sensitive Plant Species	Scientific Name	Effects of Alt. 1: No Action	Effects of Alt. 2: Proposed Action
Henderson's ricegrass	*Achnatherum hendersonii*	NI	NI
Wallowa ricegrass	*Achnatherum wallowensis*	NI	NI
Upswept moonwort	*Botrychium ascendens*	NI	MIIH (1 season)
Mountain moonwort	*Botrychium montanum*	NI	MIIH (1 season)
Dainty moonwort	*Botrychium crenulatum*	NI	MIIH (1 season)
Triangle moonwort	*Botrychium lanceolatum*	NI	MIIH (1 season)
Mingan moonwort	*Botrychium minganense*	NI	MIIH (1 season)
Northwestern moonwort	*Botrychium pinnatum*	NI	MIIH (1 season)
Dwarf suncup	*Camissonia pygmaea*	NI	NI
Back's sedge	*Carex backii*	NI	MIIH (3-6 yrs)
Inland sedge	*Carex interior*	NI	NI
Parry's sedge	*Carex parryana*	NI	MIIH (1 season)
Clustered lady slipper	*Cypripedium fasciculatum*	MIIH	BI (habitat)
Northern twayblade	*Listera borealis*	NI	MIIH
Raven's desert parsley	*Lomatium ravenii*	NI	NI

Sensitive Plant Species	Scientific Name	Effects of Alt. 1: No Action	Effects of Alt. 2: Proposed Action
Colonial luina	*Luina serpentina*	NI	NI
Bridge's cliff-brake	*Pellaea bridgesii*	NI	NI
Least phacelia	*Phacelia minutissima*	NI	BI

Effects Determinations – Sensitive Plant Species:
NI=No Impact BI=Beneficial Impact
MIIH=May impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species
WIFV=Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on sensitive plants is the project area and approximately three miles surrounding the project area. This area is chosen because it contains the sensitive-plant habitats of direct concern to the proposed action and the other actions and their effects that the proposed action might add to. The timeframe for cumulative-effects considerations includes the past 20 years, because domestic grazing, timber harvesting, and fire suppression in this period are known to have influenced the current condition of plant habitats and the plant communities they presently support. Exactly where, how, and to what extent these actions have directly affected particular sensitive-plant species, however, is not clear or certain. Part of the reason for this is that sensitive plant distributions prior to these management activities are unknown.

Related actions relevant to the analysis are actions of the past 20 years, present actions, and reasonably foreseeable future actions noted and described in Appendix C. Primary among these for their possible influence on current plant-habitat conditions in the analysis area are past and current grazing, recent large wildfires, and several past timber harvests that varied in size (acreage) and cutting methods.

As stated previously, actual effects of the related actions on current sensitive-plant habitat and plant occurrence are not known. We do know that related actions have influenced and continue to influence native vegetation cover types and densities, and that effects of changing conditions on sensitive plants—from both management and natural processes—probably vary according to requirements or preferences of individual species. But it is not clear whether, or what extent, the result of the 2005 surveys of the area—not finding any sensitive plants in their potential habitats—represents an existing impact caused by the related actions. Many of these species are ecologically specialized, which limits their possible distribution within the area. Some of them can be present and not detected by surveys because they don't grow above ground every year, or for more than only a short, irregular season. Additionally, there has not been a finding or report that any of the potential habitats in the area are currently in poor condition. This is consistent with the fact that all recent and ongoing related management actions reflect sensitive-plant considerations and corresponding conservation measures. For example, timber harvests of the past 20 years involved riparian buffers and equipment or operating restrictions. Similarly, recent and current grazing management is governed by Forest Plan standards and grazing-allotment

management plans that provide practices or controls to conserve native plants. Thus, the current condition of sensitive-plant potential habitat in the area is considered to be below any threshold of significance for possible adverse effects caused by related actions. And because the predicted direct or indirect adverse effects of the proposed action on various sensitive plants are either nil or minor at most, they would not add appreciably to any known, existing problem. For certain species, the added effect of the proposed action to the current habitat condition would in fact be beneficial.

All predicted cumulative effects of the proposed action are consistent with sensitive-plant standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All cumulative adverse effects of the proposed action on the sensitive-plant resource are considered nonsignificant as proposed.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on sensitive plants can be found in "Botany Report and Biological Evaluation for Threatened, Endangered, and Sensitive (TES) Plant Species (Laufmann, 2005)," located in the project record.

Economic and Social Components of the Human Environment

Economic or social components of human environment that may be affected include livestock grazing, the forest products economy, scenery, recreation, and cultural or historical resources. Impacts to each of these are discussed in individual sections below.

Concerning possible social impacts in the policy-defined areas of environmental justice, civil rights, tribal treaties, or inventoried roadless areas: no qualifying conditions, concerns, or effects related to the proposed action have been identified as result of internal and external scoping. Thus, there is no further discussion of these categories of effects.

Livestock Grazing

Grazing of privately-owned livestock is an important economic component of the affected human environment, because the project area involves portions of two grazing allotments, or districts—Spring Creek and Flag Prairie—where grazing is permitted to meet Forest Plan goals and objectives. Under the Forest Plan, forage production for both livestock and wildlife is desired, and commercial grazing is authorized on suitable lands, in exchange for fees and compliance with standards and practices prescribed by the Forest Service. Detailed specifications governing grazing and related improvements are provided in individual allotment management plans. The Malheur National Forest Post-Fire Interim Grazing Guidelines (2003) provide interim direction concerning possible grazing rest periods following prescribed fire.

In 2004, Land EKG Inc. of Bozeman, Montana conducted a qualitative ecological analysis of the Spring Creek and Flag Prairie allotments and reported that most sites were functioning "at or near to very stable conditions" and exceeding native herbaceous production potential. Elk sedge and pine grass are the predominant livestock-forage plants in the area.

Livestock Grazing Design Features, Conservation Measures, and Monitoring Requirements

The proposed action involves the following range or livestock-grazing special features:

- **R-1:** Grazing may resume in the area of the burn without any timing restriction if burning occurs before vegetative green-up. If burn occurs after green-up, grazing may occur after range has been determined to be ready (verified by resource personnel) or in the fall September to October without a range readiness determination.
- **R-2:** If areas are deemed to be in need of protection, grazing may resume in the grazing unit if areas can be adequately protected from grazing (i.e., electric fencing, placing supplements away from burned areas, or other protection methods).
- **R-3:** If burns occur in areas not suitable for grazing as determined by the range resource specialist, grazing may continue in the remainder of the unit that was not affected by the burn if it is suitable for grazing.
- **R-4:** If burned areas cannot be protected as described in design features R-2 through R-3, then livestock may need to be moved to another allotment or unit. The purchase of supplemental feed to replace the affected forage loss may also be considered.
- **R-5:** All fences damaged because of project activities would be repaired prior to returning grazing animals to the project area. Repair to any damaged, developed springs would also occur.
- **Monitoring:** Distribution and utilization monitoring should be done annually for 2 to 4 years post-project across the area affected by the project activities.

Effects of the Alternatives

The analysis of changes to livestock grazing that would occur under each alternative is focused on the following environmental factors:

- Range condition
- Forage availability
- Distribution of livestock
- Effects on range improvements
- Permittee access for management

Direct & Indirect Effects

If no action is taken, few if any short-term changes would occur to the forested range condition, forage availability, or distribution of livestock. In the long term, however, forage production and availability would likely decline as a result of increasing forest density and competition for light and nutrients. In turn, this may reduce the distribution of livestock within allotments or grazing units. Similarly, range improvements and permittee access would probably not change much in the short term, but could be indirectly affected in the long term—from dead trees or limbs increasingly falling on fences or other structures and the related buildup of woody debris on the forest floor.

By comparison, the proposed action would certainly cause changes in forested range conditions and forage availability within the project area, as an indirect effect of reducing tree density in many stands and underburning most upland (non-riparian) areas. The most immediate effects would occur in conjunction with burning, with some consumption of existing forage; however,

the predominant vegetation (elk sedge and pine grass) will recover very quickly after underburning, and whereas this forage is not highly preferred by livestock, a rest period from grazing is not anticipated. Forage availability likely would be reduced for less than one year, depending on the timing of the burn. Also, temporary grazing restrictions or adjustments that might be applied to conserve soils and regenerating plants (possible, not anticipated) could make forage temporarily less available. The near-term vegetation response to partial tree-removal and low-intensity burning, however, would be positive for both forage production and quality, due to reduced competition from shrubs and trees and more available soil nutrients and sunlight. In turn, the more-available upland forage, combined with less small- and medium-diameter woody debris on the forest floor, would likely improve livestock distribution and forage utilization throughout treated portions of these allotments. Range improvements would be protected or repaired if damaged, as a stipulation of contracts governing project activities. Although the need for temporary grazing deferrals or rest of pastures is not anticipated, if these are needed, they would be made in consultation with the affected permittees, to negotiate equitable solutions that are consistent with allotment management plans and permits that apply.

All proposed activities and their predicted effects are consistent with relevant grazing and range-management standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All direct and indirect adverse effects of the proposed action on livestock grazing and forested range conditions are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on livestock grazing consists of the combined, affected grazing allotments—Spring Creek and Flag Prairie, comprising approximately 86,718 acres. This large area encompasses nearly all of the project area and extends north from it 10-12 miles and east-southeast 8-10 miles. It is selected because, even though the proposed action would treat only a small portion of it (about 2 percent), effects of the proposed action have potential to affect each allotment and its administration as a whole.

The temporal scale selected for cumulative considerations is from 1990 to 2015. Data concerning the condition of these allotments prior to 1990 is generally lacking, making it difficult to judge whether, or what extent, timber harvests or other management of actions of preceding decades may still be influencing current grazing conditions and management in these areas. Since 1990, however, data has been collected, due in part to a large fire in that year that affected both allotments. Future activities proposed by the Malheur National Forest are, in general, on a ten-year planning cycle, making it conceivable to consider related actions up to 2015.

Related actions relevant to the analysis are actions of the past 15 years, present actions, and reasonably foreseeable future actions noted and described in Appendix C. Primary among these for their influence on current grazing and forested range conditions in the analysis area are timber harvests (about 3,835 acres in the Spring Creek allotment, by various cutting methods from 1990 to 1995), a 1990 wildfire (about 4,839 acres, mostly in the Spring Creek allotment), and future forest-health and fuel-reduction projects (about 14,038 acres in the Flag Prairie allotment and 7,136 acres in the Spring Creek allotment, involving thinning and prescribed fire). The current and near-future effects of these related actions on livestock grazing are positive, because each of them has improved, or soon will improve, forage production and availability and livestock distribution throughout each allotment. Thus, these related actions are not causing any

adverse effect on livestock grazing or forested range conditions that might be made worse by adverse effects of the proposed action. Therefore, the short-term, indirect adverse effects of the proposed action (temporary loss of forage in the project area, possible temporary grazing restrictions or adjustments) are not cumulative in nature, meaning they cannot contribute toward a collectively significant cumulative impact. Longer-term beneficial effects of the proposed action on grazing, however, would soon add to the positive effects of the other related actions in this area.

All predicted cumulative effects of the proposed action are consistent with relevant grazing and range-management standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

No adverse cumulative impacts of the proposed action on livestock grazing and forested range conditions are predicted.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on livestock grazing can be found in "Range Resource/Noxious Weeds Specialist Report (Laufmann and McArthur, 2006)," located in the project record.

Forest Products Economy and Environmental Justice

The forest products economy is an important component of the affected human environment, for two reasons: First, because commercial timber would be sold and removed in conjunction with the proposed treatments; secondly, because the businesses that buy and remove timber, and manufacture forest products from it, are major contributors the economic well-being of the area. For example, in the combined economies of Grant and Harney counties, 15 to 20 percent of employment is provided by the timber and forest products industry (Forest Plan Final EIS, USDA Forest Service 1990a).

Additionally, participants in the collaborative project-planning session emphasized the importance of meeting all current forest-management needs in the project area, and in conjunction, offering for sale any available yield of timber or other raw forest products. This advice was consistent with the two primary polices authorizing the proposed action: the Forest Plan which emphasizes timber harvest from suitable acres to attain various public goals, and the Healthy Forests Restoration Act which provides for timber harvest according to certain design requirements. Whereas this collaborative advice was used to help shape and define the proposal, it reinforces the need to describe effects of the proposed action, compared to no action, on the area forest products economy.

The analysis of changes to the forest products economy that would occur under each alternative is focused on the following environmental factors:

- Timber supplied to the area forest products industry
- Timber, forest products and related jobs sustained in the area economy for one year
- Total income generated

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. The analysis also addresses potential effects to minority populations, disabled persons, and low income groups.

Forest Products Economy Design Features, Conservation Measures, and Monitoring Requirements

The proposed action is, by its purpose and nature, designed to remove trees currently contributing to crown-fire potential or bark-beetle risk. To the extent that this can be accomplished through viable commercial treatments, the proposed action is also designed to sell public timber or other raw forest products to benefit the forest products economies of nearby communities. In conjunction, the proposed action is designed to retain sufficient stocking of forest vegetation to fully occupy timber-growing sites, and thereby contribute to efficient growth and future yields of commercial timber from suitable acres. Beyond these basic design considerations, however, the proposed action involves no special features to ensure current timber production or salability, or to avoid any potential adverse effect on timber and forest-products workers or manufacturers.

Effects of the Alternatives

Direct & Indirect Effects

Each million board feet of national forest timber supplied annually to the area timber and forest products industry supports at least 8.5 jobs—about 5.3 jobs in the industry itself, and about 3.2 more in related supply or service industries. Based on data from 1998, estimated income generated by each million board feet is $251,070, or about $29,355 a year for each primary and secondary job (these facts are derived from job and income multipliers in the IMPLAN economic-impact model used by the Malheur National Forest).

If no action is taken, there is an adverse effect on the area forest products economy from reduced timber supply to loggers, haulers, and wood products manufacturers. The immediate effect is difficult to assess. In the short term, it is possible (though not certain) that if no timber was offered from the 16 Road Forest Health project, the industry could instead procure an equivalent amount from other sources. Under this assumption, however, timber supply from sources other than the national forests theoretically declines in the longer term, and manufacturing is reduced as a consequence. In this event, material support is removed for up to 24.7 jobs in the timber and forest products industry and connected sectors of the area economy for one year. The total value (in 1998 dollars) of lost income from these jobs would be approximately $725,000.

With the no action alternative, all current uses of the National Forest System lands would continue, including recreation, harvesting of nontimber forest products, special-use permits, subsistence uses, and spiritual/aesthetic uses. Effects to minority populations, disabled persons, and low-income groups would not be disproportionate with other users of the National Forest System lands.

By comparison, the proposed action would offer for sale approximately 2.9 million board feet of public timber. (In practical terms, this amount of timber converted to building materials at the same scale is the amount used to construct approximately 223 typical American homes—assuming 13,000 board feet are used to build a roughly 2,000-square-foot home with two-car garage.) It is likely that the designated (standing) timber would be purchased by local-area logging contractors or wood products manufacturers, who would perform or contract for its harvest and delivery to area manufacturing facilities, where it would be converted into building materials that are sold in the national market. In this event, the combined logging, manufacturing, and marketing process would sustain approximately 24.7 jobs in the timber and

forest products industry and connected sectors of the area economy for one year, and provide estimated income totaling the current dollar equivalent of $725,000 in 1998.

All proposed activities and their predicted effects are consistent with relevant timber-management standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All direct and indirect adverse effects of the proposed action on the forest products economy are considered nonsignificant as proposed.

With implementation of the proposed action, there would be no disproportionately high adverse human health or environmental effects on minority or low income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to contractors implementing harvest and thinning activities. The proposed action alternative would provide a variety of opportunities for potential contractors. Racial and cultural minority groups are often prevalent in the work forces that would implement fuel treatments and thinning activities. Contracts contain clauses that address worker safety.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on the forest products economy is Grant and Harney counties, as this two-county area is the Malheur National Forest "zone of influence" defined for the economic impacts analysis in the Forest Plan Final EIS. Relevant related actions include all timber sales on all land ownerships during the past five years and over the next five years.

None of the relevant past or present related actions has produced a currently existing adverse effect on the forest products economy. None of the relevant future related actions would produce an adverse effect on the forest products economy. Therefore, the proposed action cannot contribute toward a collectively significant cumulative impact on the forest products economy, because there is no existing or anticipated adverse effect to add to. Effects of the other related actions are, or will be, beneficial to the forest products economy, and the proposed action would add to the positive effects of these other actions.

All predicted cumulative effects of the proposed action are consistent with relevant timber-management standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

No adverse cumulative impacts of the proposed action on the forest products economy are predicted.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on the forest products economy can be found in "Economic Report (Powell and McCumber, 2006)," located in the project record.

Scenery and Recreation

Scenery is an important component of the affected human environment because most of the project area lies within the Glacier Loop visual corridor, a scenic motorized travel route formed in part by areas along Forest Road 16. Current and desired conditions in the area related to scenery are generally described in Part 1: Need for the Proposal. Recreational use of the area is

an environmental component closely related to scenery: In addition to recreational driving, people use the project area for camping at undeveloped sites, hunting, and snowmobiling on designated roads, according to season. Forest Road 16 itself, which travels through the core of the project area, and other connected roads on or near the project perimeter are designated snowmobile routes in winter.

Scenery and Recreation Design Features, Conservation Measures, and Monitoring Requirements

The basic design of the proposed action is strongly influenced by scenery factors, especially along both sides of Forest Road 16, where treatment combinations are specially devised to meet the foreground "partial retention" objective of the Forest Plan for visual quality. This objective requires that any fuel-hazard or beetle-risk treatments seen from the main road "remain visually subordinate to the characteristic landscape." In other words, after treatment (or within one year) these areas must look like natural forests typical of this environment, not obviously modified or disturbed. Additionally, proposed treatments throughout the whole project area are conformed to the recreation-opportunity standard called "roaded natural setting." This requires naturalistic appearances in which forest-management work and other human uses, which may be evident, still harmonize with the natural environment.

The locations of all proposed treatments, including those combinations along the Forest Road 16 that are specially designed as scenic foreground, are shown on the proposed action map, Figure 3. Also, each treatment combination is generally described in Table 1. Detailed features of individual treatments within these combinations—some of which specifically target scenery or recreation objectives—can be found in the preceding "Forest Vegetation" section.

In addition to the fundamental design considerations described above, the proposed action involves the following scenery and recreation special features:

- Unit Design and Layout—General Requirements Applicable to All Areas:
  - To avoid ground-disturbing activities visible from FR 16, winter logging is required.
  - If any recreation special-use permits are issued for the project area during treatment operations, users would be informed of operations in the vicinity and possible hazards that may be encountered through proper signage or other means.
  - In order to blend treatment units and create free-form vegetation patterns that mimic natural patterns, straight lines and geometric shapes for unit boundaries would be avoided or minimized.
  - If necessary, unburned slash in the foreground area within 150 feet of FR 16 would be scattered to reduce the color contrast of any exposed soil at burn-pile sites.
  - No boundary paint would be used parallel to FR 16. Boundaries running horizontal to this road will have tags, flagging and boundary paint.
  - Tree or shrub islands of various shapes and sizes would be retained in a random distribution pattern where possible, to provide a characteristic vegetation appearance while meeting objectives for fuel reduction and bark-beetle risk reduction.
- Immediate Foreground Design and Layout—Specific Requirements Applicable to Certain Areas:

  The following design features are specific to treatment areas that fall within the immediate foreground of scenery or recreation sites such as the 16 Road and all

snowmobile routes. The immediate foreground is 300 feet from scenic corridor boundary into the project area or 150 feet on either side of a recreation site. The following design features apply to the first 150 feet unless otherwise stated:

- On slopes facing Forest Road 16, slash-burn piles will be placed up to 50 feet away from the road where practicable, to reduce visual impacts
- In the 150-200 foot zone away from the center point of FR 16, slash would be removed, grapple-piled and burned, or hand-piled and burned.
- Stumps would be cut flush or close to the ground where practicable and always within 6 inches of the ground on the uphill side.
- If after one year pile-burned sites are visible from the 16 Road, reburning, scattering, covering with natural duff, or masticating burned piles would be accomplished in order to minimize visual impact of management activities.
- In travel corridors, temporary roads leading to landings would not be located perpendicular to FR 16 or recreation areas in order to minimize the forest visitor's direct views into landings. Where practical and warranted to reduce scenery or recreation-use conflicts, landings would be located off system roads.
- Where practical, avoid placing skid trails within 100 feet of FR 16.
- Skid trails should be placed at different angles to each other and roads.
- Any snowmobile routes that conflict with project activities will be signed with proper signage and alternate routes will be utilized during the implementation of the project. Alternative routes will be limited to existing approved snowmobile routes that are part of the Forest trail system. Signage will be coordinated with the local snowmobile club.
- The Malheur National Forest Road Rules will apply during commercial log hauling. These rules will be included in the timber sale contract, and regulate conditions to which the road must be maintained.
- Within the foreground areas in the harvest units, a mosaic of stocking levels and tree sizes will be retained. Avoid creating abrupt transitions between thinned and unthinned stands in the foreground.
- Marking paint observed from FR 16 is to be applied to the side of the tree facing away from the road. Ribbon and signs in this 150-foot zone are to be removed upon completion of the harvest unit activities.
- Prior to harvest, the locations and clearing for all temporary roads and landings within 150 feet of FR 16 will be reviewed by a landscape architect or recreation specialist. Harvest activities in this zone must maintain a slightly altered landscape. The ground disturbance must be minimal and the size and number of landings in the zone must be minimized. If the burning of the landing piles in this zone will cause more than 20 percent tree mortality surrounding the piles, consider either chipping or hauling the slash to a disposal area.
- Burning prescriptions in visual foreground areas would be developed to produce low intensity fire, minimizing damage to the larger-diameter overstory trees. Those trees greater than 21 inches DBH within 200 feet of FR 16 would be protected from high intensity flames that could cause mortality. This protection could include such activities as raking needles away from the base of trees or wetting down the area around the tree prior to ignition. Burning intensities will be controlled by ignition

methods and techniques to retain a minimum of 80 percent of the live crowns. Isolated small trees within a stand of larger trees may end up having less than 80 percent of the live crown remaining.

Effects of the Alternatives

The analysis of changes to scenery and recreation that would occur under each alternative is focused on the following environmental factors:

- The predominance of large trees in the scenic motorized travel corridor
- Foreground visual diversity in the scenic motorized travel corridor
- Opportunities for dispersed recreation including camping at undeveloped sites or hunting
- Opportunities for winter snowmobile recreation on designated routes

Direct & Indirect Effects

If no action is taken, it is likely that current views from the travel corridor—that of a moderately dense forest with mixed size-classes of trees and variable concentrations of woody debris on the ground—would not change very noticeably for several years, assuming no large fire occurs. Thus, the current condition would continue to reflect its scenic qualities until disturbed by bark-beetle activity (more likely with each passing year, certain in the long term) or a large fire (possible in any year, but not predictable). These current scenic qualities include a generally pleasant, naturalistic appearance in which past cutting or other management is not highly evident and the visual-quality objective of partial retention is thereby met. In relation to scenic qualities desired for this area, however, the current and near-future condition does not adequately draw attention to, or provide for further development of, large trees; and, as one travels through the corridor, one does not see much horizontal diversity such as changing vegetation patterns or densities, or variable depths of view into the forest. Current recreational uses, like scenic qualities, are not likely to change very much until bark beetles or a large fire disturbs the forest. Changes expected from these agents, which are discussed in detail in other sections of this report, would adversely affect desired conditions for both scenery and recreation. With bark beetles, many large trees would be lost and many tons per acre of woody debris would be added to the forest floor, impacting both visual quality and dispersed recreation such as hunting or other foot travel. Winter snowmobile access on designated routes, however, should not change, because system roads on which these routes occur would be kept clear of fallen bug-killed trees. In the even of a large fire, the primary impact to scenic and recreational values would simply be the loss of many large trees.

By comparison, the proposed action would immediately change the appearance of the forest, especially in foreground views seen from Forest Road 16, by removing many small and medium-size trees and making the forest generally less dense (though with much variation from one stand or patch to the next), and by retaining a variety of vertical stand structures including both even-age and uneven-age conditions. Additionally, a change toward a higher proportion of large trees (favored for retention in all areas) would be very apparent. As one traveled through the corridor, he or she would also notice more horizontal diversity; that is, more variety of vegetation patterns and densities, including special cover areas reserved for wildlife nesting, hiding or travel corridors, riparian conservation, or aspen enhancement, intermixed with some deeper views into the forest. The winter-only logging restriction that applies to the project would avoid most visual evidence of disturbance to low vegetation or the soil surface. Blackened ground from low- to moderate-intensity underburning would be obvious—though not everywhere—for up to one year in most foreground views, with substantial green-up occurring in most areas no later

than the second year. Special treatments to remove or reduce burned trees or evidence of burn piles would help achieve the visual-quality objective of partial retention within one year as required. During logging or burning operations, it is likely that some recreational uses may be temporarily interrupted (at intervals, over the next several years). During this period, some recreationists who prefer this area might be temporarily displaced to other areas; however, general recreation in the area likely would continue except where the Forest Service applies actual temporary restrictions for public safety. For example, winter logging would not conflict with the predominant recreational uses of summer driving through the scenic corridor or fall hunting; such activities would only (possibly) be restricted on actual burn days. The biggest temporary change to recreation would be to snowmobile use. During winter logging operations (probably involving only one winter season, most likely 2006-2007), designated snowmobile routes in the project area would be closed; however, one or more alternate routes will be signed as substitutes for the temporary closure of these routes. The alternate routes will be limited to existing designated snowmobile routes that are part of the Forest trail system. Use on alternative routes is not expected to increase appreciably during the temporary closure period.

Through the longer term (about 20 years), the proposed action would reduce the likelihood of severe impacts to scenery and recreation from bark beetles or intense fires. Additionally, by improving the vigor of the forest with emphasis on developing large trees, the proposed action would increase the likelihood of achieving all of the desired conditions for the visual corridor set forth in the Forest Plan.

All proposed activities and their predicted effects are consistent with scenery and recreation standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies. Regarding standards for Management Area 14—Visual Corridors in particular, the proposed action is consistent with the foreground partial retention and middleground modification standards that apply to the Glacier Loop visual corridor, of which the project area forms a part. Silvicultural activities such as commercial thinning, pre-commercial thinning, and prescribed fire, may be conducted after the appropriate environmental analysis process has been followed, prior to a viewshed corridor plan being completed (Correction #1 to Forest Plan, 1/31/1995). The proposed action also conforms to the roaded-natural recreation standard in all areas. Regarding MA14 standards for residue management, the proposed action employs special treatments to avoid or minimize adverse visual effects, including a timing restriction on logging (winter-only), generally low-intensity underburning, and selected cutting or removal of smaller burned trees in the immediate foreground areas of the visual corridor.

All direct and indirect adverse effects of the proposed action on scenery and recreation are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on scenery and recreation is the project area, with special attention to foreground of the Glacier Loop visual corridor—that is, the visible or potentially visible foreground areas seen from Forest Road 16. According to the Forest Plan, foreground consists of "the portions of a view between the observer and up to ¼ to ½-mile distant." The visual-corridor foreground is the main focus of cumulative-effects considerations because it is the area specified in the Forest Plan that must meet the partial retention visual-quality objective, which is the highest visual-quality standard applicable in the project area. Other lands in the project area beyond the visual-corridor foreground are also of concern for possible cumulative impacts to scenery or recreation, because all lands assigned to

Management Area 14—Visual Corridors and Management Area 3B—Non-Anadromous Riparian Areas (together making up 86 percent of the project area) are managed for the "roaded-natural" class of recreation opportunities, which emphasizes naturalistic appearances in a roaded setting.

Possible incremental effects of the proposed action added to other past, present, and reasonably foreseeable future actions falling within the visible or potentially visible foreground were investigated. This included review and consideration of twenty harvest projects in the Crane Creek subwatershed going back to 1973 (noted and described in Appendix C), the effects of which might still be evident. It was found that, of these past harvest projects, those in or near the current project area were primarily reproduction-harvest treatments, which by design removed larger overstory trees and generally changed stands toward younger and more even-aged conditions (Amell). The harvests causing the most visual modification, however, were generally located away from Forest Road 16—beyond foreground views, in middleground or background areas. But because it appears none of these actions specifically featured large-tree retention or purposeful enhancement of horizontal visual diversity, their present effects can be considered at least partially adverse to current scenery-management objectives for the visual corridor. This management problem exists even though these roadside areas probably seem pleasant and even naturalistic to many viewers. The proposed action, however, would not add to any existing adverse scenery effects of these past actions. Rather, the cumulative effect of the proposed action, when added to these past actions, is to improve visual quality by retaining, and enhancing the development of, large trees; and by increasing the horizontal diversity of forest conditions.

Concerning recreation: Past harvest actions, while apparently not focused on large-tree retention or enhancement of horizontal visual diversity, still maintained a forest-recreation environment in the project area that currently meets the roaded-natural standard. Thus, there are no currently existing adverse effects of these past projects on known recreation values. Consequently, the only appreciable adverse effect of the proposed action on recreation—the temporary loss, with substitution, of snowmobile routes—does not add to any existing adverse recreation effect.

In addition to past actions, present or future actions in the general vicinity were reviewed, to consider whether effects of the proposed action on scenery or recreation might combine in the project area with any related effects of these other actions. In relation to scenery, four future forest-health projects in the Crane Creek subwatershed (noted and described in Appendix C) were reviewed, but none these were found to have any reasonably foreseeable effects on scenery or recreation in the project area. Consequently, effects of the proposed action on scenery are not considered cumulative in relation to these. In relation to recreation, currently planned additional road closures or decommissioning under the Phoenix project were considered. These will remove some routes that the visiting public is currently able to drive or use for dispersed camping. Whereas implementing these previously approved actions is consistent with public forest recreation policy applicable to the area (Forest Plan goals, objectives, and standards), it is not seen as an adverse effect on the recreation environment. Open roads consistent with policy will still be present in the area. Thus, there is no adverse effect that could be incrementally increased by effects of the proposed action; and even if there were, the proposed action does not cause any additional closures or decommissioning.

All predicted cumulative effects of the proposed action are consistent with scenery and recreation standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

No adverse cumulative impacts of the proposed action on scenery or recreation are predicted.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on scenery and recreation can be found in "Scenery and Recreation Report (Bonnett, Winegar, and Larson, 2006)," located in the project record.

Cultural or Historical Resources

Cultural and historical resources are important components of the affected human environment because the general public places high value on these resources, and has expressed these values through many public laws, regulations, policies and agreements that apply to the project. Chief among these is the National Historic Preservation Act (NHPA) and its related implementing regulations that govern protection and management of archaeological sites and historic properties. Additionally, the Forest Plan contains standards for complying with all public policies governing the protection and management of such resources. These standards address operational activities such as field surveys and survey methods, evaluating the significance of identified sites and their eligibility for the National Register of Historic Places (NRHP), and considering project-related effects in consultation with other agencies and interested tribal offices. Forest Service projects that potentially affect cultural or historical resources are reviewed by the Oregon State Historic Preservation Office (SHPO) for NHPA compliance.

The human history of the project area includes hunting and root digging by Native Americans, particularly in the adjacent Crane Prairie or Crane Meadows area; the Douglas and Howell Toll Road built in 1860 that in 1869 became the Dalles Military Road (on a southeast-to-northwest route formed by current forest roads 1663809, 1663000 and 160000); livestock grazing starting in the late 1800s; an early Forest Service telephone system built through the area in 1915; and an early Forest Service ranger station at Crane Prairie built in the early 1930s.

The "area of potential effect" (APE) for consideration of possible project-related impacts is the project area, because the proposed action does not cause changes of sight, sound, or atmospheric conditions that could affect cultural or historical resources outside the project area.

Recent cultural-resources work in the project vicinity has comprised five cultural resource inventory surveys, literature reviews, and consultation with American Indian tribes and other stakeholders that are historically associated with the area. The work has focused on identifying prehistoric archaeological sites, historic archaeological sites, and places that support resources of contemporary tribal interest.

Thirteen cultural resource properties have been identified within the 16 Road APE, including four prehistoric, five historic, three with both prehistoric and historic components, and one prehistoric isolated occurrence. Eight of the 13 properties have been evaluated as eligible or potentially eligible for the NRHP. The remaining four sites and the one prehistoric isolated occurrence were determined to be ineligible for the NRHP and have been removed from management consideration.

The prehistoric sites in the project area typically are "lithic scatters"—stone artifacts and residues of their manufacture or rejuvenation that are visible at the ground surface, related to occupations of hunter-gatherers spanning several thousand years. The primary value of these sites is their potential contribution to scientific or scholarly information, or studies of the prehistoric and early historic past.

The historic properties in the project area consist of elements 50 years or older such as foundations or structural ruins, carvings on trees, wood troughs, trash dumps, and telephone poles or insulators. These are variously associated with the historical presence of the Forest Service, Depression-era grazing, or the Dalles Military Road. All identified historic sites have been altered to some degree by past timber harvest, livestock grazing, road construction, dispersed recreation, or fire effects. Like prehistoric sites, these sites are currently valued for their potential to yield important scientific or scholarly information.

Concerning contemporary American Indian interests: Presently, there are no specific places within the 16 Road APE determined to be important for traditional American Indian land-uses such as cultural or religious sites or areas used for subsistence on plants or animals. In a previous consultation with the Burns Paiute concerning the Merit Analysis Area located west of the project area, however, concern was expressed for populations and distributions of culturally important plant species on all parts of the Malheur National Forest.

Cultural or Historical Resources Design Features, Conservation Measures, and Monitoring Requirements

The proposed action involves the following cultural- or historical-resources special features:

- All NRHP-eligible and potentially eligible (unevaluated) sites will be avoided or protected from any ground-disturbing impacts during all timber harvest activities.
- There will be no piling of slash or woody debris, either by hand or with ground-based machines, within the boundaries of any site; all hand-piling and burning of slash or fuel concentrations will take place outside of the site boundaries.
- All eligible and potentially eligible (unevaluated) historic properties with structural remains or other wooden feature types will be avoided or protected during all burning activities. Eligible historic remains will be identified on the ground and proper protection measures will be conducted during the burning activities.
- Under the terms of the Management Strategy for the Treatment of Lithic Scatter Sites (Keyser et al. 1988), low-intensity burning will have no effect on the prehistoric lithic assemblages.
- Sites will be monitored during implementation of project activities.
- If cultural resources are located during implementation of the action alternative, work will be halted and the District Archaeologist will be notified. The cultural resource will be evaluated and an impact-avoidance plan developed in consultation with the Oregon SHPO, if necessary.

Effects of the Alternatives

The analysis of changes to cultural or historical resources that would occur under each alternative is focused on the following environmental factors:

- NRHP-eligible and potentially eligible prehistoric archaeological sites
- NRHP-eligible and potentially eligible historic archaeological sites
- Native plants or plant habitats of potential contemporary interest to American Indians for traditional uses

Direct & Indirect Effects

If no action is taken, currently existing prehistoric or historic properties, and plant communities potentially of interest for traditional use by regional American Indian tribes, likely would not change appreciably in the foreseeable future, provided forest stands and habitats within or surrounding these resources are not disturbed by intense fires. Potential fire intensity would not be reduced, however, in the absence of the proposed action; thus, in the event of a future wildfire, it is possible that historic properties in particular, which are most vulnerable to fire, would be damaged or destroyed. Intense wildfire would certainly alter plant communities, too, probably to a greater extent than they normally were altered historically by typical, low- to mixed-severity surface fires, including burning caused by American Indians. This is because current fuel conditions are considered highly departed from historic characteristics, reflecting higher potential fire intensity.

By comparison, the proposed action also would not directly cause changes to any prehistoric or historic properties, because they would be avoided or protected by virtue of the required design features and conservation measures detailed above. This will involve removing or separating from logging areas three archaeological properties that are within or adjacent to proposed commercial thinning units. It also involves keeping planned underburning treatments out of two sites that have both prehistoric components (lithic scatter) and historic components requiring protection. (Even though low-intensity fire likely would have negligible effects on the lithic-scatter sites, the presence of the historic components, which are more vulnerable to prescribed fire, makes avoidance a prudent choice and affords the maximum protection for both kinds of resources involved.)

Additionally, the risk of severe wildfire impacts to both prehistoric and historic resources in the area would be reduced by the proposed action, because it would alter current fuel conditions and appreciably reduce potential fire intensity. Indirectly, this would enhance the long-term stability of archaeological and historic resources in or near the project area.

The habitat of plant communities traditionally important to regional tribes of American Indians may benefit from the proposed action, because it would change forest and fuel conditions to more closely resemble the historic patterns or range of variability, implying less-intense future wildfires and consequently less-severe potential impacts to native plant communities and their physical growing-sites.

All proposed activities and their predicted effects are consistent with relevant cultural or historical resource standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies. Regarding pertinent requirements of the National Historic Preservation Act in particular: the project area has been thoroughly surveyed for cultural or historical resources; eligibility of properties for the National Register of Historic Places has been evaluated; appropriate protections have been applied; and a report has been filed with and reviewed by the Oregon State Historic Preservation Office with no additional recommendations returned.

All direct and indirect adverse effects of the proposed action on cultural or historical resources are considered nonsignificant as proposed.

Cumulative Impacts

The area of consideration for cumulative effects of the proposed action on cultural or historical resources is the project area, because this is the “area of potential effect” (APE) established for

consideration of possible project-related impacts, including cumulative impacts. The project area is the APE for this analysis because the proposed action does not cause changes of sight, sound, or atmospheric conditions that could affect cultural or historical resources outside the project area.

Whereas previous timber harvests, livestock grazing, wildfires, road construction and dispersed recreation of the historic period have altered the 13 cultural-resource sites currently identified in the project area, the current cumulative condition is considered adversely affected by these past actions. The proposed action, however, is unlikely to add to or increase any existing adverse effects, because the protection and monitoring requirements integrated into the action are almost certain to avoid any new adverse effects.

Without the integrated protection measures in place, logging would pose the main risk, because even minor mechanical disturbance of archaeological sites can cause irreversible, permanent damage. But for known sites, this risk is minimal, unless site boundaries somehow are poorly defined, supervised, or controlled by the Forest Service during project operations. There is some possibility that additional unknown (especially buried) sites exist that inadvertently could be damaged (though this, too, is not likely, given the winter-only logging requirement), but monitoring and consultation requirements of the proposed action would manage this risk and reduce the possibility of serious impacts.

The planned burning may serve to reverse the past, adverse cumulative trend and actually enhance long-term stability of historic properties in the project and adjacent areas. This is because the planned fuel treatments reduce the potential intensity of future wildfires, and therefore, also reduce the risk of severe wildfire impacts to both prehistoric and historic resources. Additionally, the lower open-road densities that will result from currently planned additional road closures or removals under the Phoenix project (to be completed in same time frame as the proposed action) will result in less motorized access to portions of the project area and a corresponding lower likelihood that cultural sites would be vandalized.

No adverse cumulative effects to native plants or plant habitats of potential contemporary interest to American Indians are predicted. This is because there are no known existing or soon-to-exist adverse effects to any such resource in the project area that could be made worse by an adverse effect of the proposed action. But even if there were a current adverse effect, the effect of the proposed action is considered beneficial to such resources, not adverse (see discussion of direct and indirect effects); thus, any cumulative effect to the current condition would be considered beneficial as well.

All predicted cumulative effects are consistent with relevant cultural or historical resource standards of the Forest Plan and its associated amendments and the requirements of other applicable laws, regulations, and policies.

All cumulative adverse effects of the proposed action on cultural or historical resources are considered nonsignificant as proposed.

References to More Detailed Information or Analyses

Additional details about effects of the proposed action and no-action alternative on cultural or historical resources can be found in “Heritage Specialist Report (Robertson, 2006),” located in the project record.

Part 4: Agencies and Persons Consulted

Interdisciplinary Team

Archaeology: Mary E. Robertson, USDA Forest Service, Prairie City, Oregon

Botany: Julie Laufmann, USDA Forest Service, TEAMS Planning Enterprise Unit, Fort Collins, Colorado

Fire, Fuels Management & Air Quality: Roy L. Walker, USDA Forest Service, Prairie City, Oregon

Fisheries Biology: Tiffany Vanosdall, USDA Forest Service, TEAMS Planning Enterprise Unit, Highlands Ranch, Colorado

Forest Economics: Glenn D. Powell, USDA Forest Service, Prairie City, Oregon

Forest Engineering: Kim Conlee, USDA Forest Service, John Day, Oregon

Forest Service Fire Management (Fire Management Officer): Lance M. Delgado, USDA Forest Service, Prairie City, Oregon

Forest Service Operations Management (District Ranger): Brooks Smith, USDA Forest Service, Prairie City, Oregon

Geographic Information Systems & Cartography: Bill Overland, TEAMS Planning Enterprise Unit, Sacramento, California

Hydrology and Soils: Carol Thornton, TEAMS Planning Enterprise Unit

Landscape Architecture & Forest Recreation: Cameron D. Bonnett, USDA Forest Service, TEAMS Planning Enterprise Unit, New Orleans, Louisiana

Logging: John Jesenko, USDA Forest Service, Baker City, Oregon

NEPA Coordination*:* Ryan K. Falk, USDA Forest Service, Prairie City Oregon & T. Bart Lander, USDA Forest Service, Boise, Idaho

Project Management (Team Leader): Paul E. Klug, USDA Forest Service, TEAMS Planning Enterprise Unit, Kalispell, Montana

Public Affairs*:* Pattie L. Hammett, USDA Forest Service, John Day, Oregon

Range & Weed Management: Julie Laufmann, USDA Forest Service, TEAMS Planning Enterprise Unit, Fort Collins, Colorado

Silviculture: Larry L. Amell, USDA Forest Service, TEAMS Planning Enterprise Unit, Prairie City, Oregon

Wildlife Biology: Marynell Oechsner, USDA Forest Service, TEAMS Planning Enterprise Unit, Cody, Wyoming

Editing: Judy A. York, USDA Forest Service, TEAMS Planning Enterprise Unit, Sandpoint, Idaho

Federal, State, and Local Agencies

Members of the interdisciplinary planning team shared documents with, and twice informally consulted by teleconference with, representatives of the U.S. Fish and Wildlife Service and the National Oceanic & Atmospheric Administration, to ensure that the project design was consistent with applicable requirements for threatened or endangered species or their habitats that may be affected by the action.

Additionally, the proposed action and invitation to comment was mailed to the Oregon Department of Fish and Wildlife; however, no comments or request for field consultations were received.

Tribes

The proposed action and invitation to comment was mailed to three potentially interested American Indian Tribes: the Confederated Tribes of Warm Springs, the Confederated Tribes of the Umatilla Indian Reservation, and the Burns Paiute Tribe. No requests for consultation were received.

Others

Forest Economics: Charlotte McCumber, USDA Forest Service, Prairie City, Oregon

Landscape Architecture: Rick Larson, USDA Forest Service, Prairie City, Oregon

Range: Ted McArthur, USDA Forest Service, Prairie City, Oregon

Recreation: Shannon Winegar, USDA Forest Service, Prairie City, Oregon

Silviculture: Eric Werner, USDA Forest Service, Prairie City, Oregon

Wildlife: Ken Schuetz, USDA Forest Service, Prairie City, Oregon

Hydrology/Soils: Jim Soupir, USDA Forest Service, Prairie City, Oregon

NEPA Review: Carole Holly, USDA Forest Service, John Day, Oregon

Literature Cited

Altman, Bob. 2000. Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington. Version 1.0 97 pp. + Appendices A-C.

Amell, Larry. 2005. The 16 Road Forest Health and Fuels Reduction Project Silviculture Report. 37 pp.

Briese, D.T. 1996. Biological control of weeds and fire management in protected natural areas: Are they compatible strategies? Biological Conservation 77(2-3): 135-141.

Cochran, P. H., J. M. Geist, D. L. Clemens, Rodrick R. Clausnitzer, and David C. Powell. 1994. Suggested stocking levels for forest stands in northeastern Oregon and southeastern Washington. USDA Forest Service. Pacific Northwest Research Station. PNW-RN-513.

Kerns, B.K., Thies, W.G., Niwa, C. 2006. Season of severity of prescribed burn in ponderosa pine forests: implications for understory native and exotic plants.

Maret, M.P. and M.V. Wilson. 2000. Fire and Seedling population dynamics in western Oregon prairies. Journal of vegetation science 11(2): 307-314.

Powell, David. (1999). Suggested stocking levels for forest stands in northeastern Oregon and southeastern Washington: an implementation guide for the Umatilla National Forest. United States Dept. of Agriculture. Forest Service. Pacific Northwest Region. Umatilla National Forest, Walla Walla, WA. Technical Publication: F14-SO-TP-03-99.

Thomas, Jack Ward. Tech. Ed. US Department of Agriculture. Forest Service. Agriculture Handbook No. 553. Wildlife Habitat in Managed Forests the Blue Mountains of Oregon and Washington. September 1979. 512. pp.

USDA Forest Service. 1990. Malheur National Forest Land and Resource Management Plan, Final Environmental Impact Statement. Malheur National Forest, John Day, OR.

USDA Forest Service. 1990a. Malheur National Forest Land and Resource Management Plan. Malheur National Forest, John Day, OR.

USDA Forest Service. 1995. Inland Native Fish Strategy Environmental Assessment: Decision Notice and Finding of No Significant Impact. Intermountain, Northern, and Pacific Northwest Regions.

USDA Forest Service. 1995a. Malheur National Forest Supervisor's Correction #1 to the forest plan. Malheur National Forest, John Day, OR.

USDA Forest Service. 2003. Malheur National Forest Post-Fire Interim Grazing Guidelines. Malheur National Forest, John Day, OR.

USDA Forest Service. 2005. Malheur National Forest Quarterly Schedule of Proposed Actions. Available at http://www.fs.fed.us/r6/malheur/projects/sopa/sopa-05-fall.pdf

Appendix A: Summary of External Comments on the Proposal

This report summarizes information, advice, concerns, and ideas about the *16 Road Forest Health* project received to date from members of the public or other interested parties, in response to formal "external scoping" of the project proposal.

The proposal and invitation to comment was issued on February 17, 2005, and mailed to approximately 220 parties, including adjacent landowners; other citizens who had previously requested such notice; interested American Indian tribes; interested agencies of federal and state governments; interested environmental, conservation, and recreation interest groups; and interested businesses or industry associations. Two parties responded to the proposal by letter or email in the timeframe requested. Public participation in this project is open-ended, and continues through all stages of project development, decision-making, and implementation.

Comments received were included in this summary if they appeared to *address natural-resource conditions or human environmental values that are related to the proposed action by policy, design, or effect.* The full text of comments received is contained in the project record.

Comments summarized below are presented roughly in the order received. Bracketed notes following each comment explain how the Forest Service considered or applied the comment.

- "We feel that at this point there is not enough cover for the animals to escape to since the North side has already been burnt and the South side has been thinned.

  The habitat that our wildlife need is simply not there and because of that the animals are not there as they should be.

  We are [hunters] and part of what we are about is protecting habitat. Please consider, if this project goes forward, leaving areas of cover and escape routes for the wildlife."

  [The proposed action was designed to retain cover to meet Forest Plan Standards for big game summer range. Currently, total cover is 37%, exceeding the Forest Plan standard of 20%. Satisfactory cover is at 7%, less than the Forest Plan standard of 12%. Marginal cover is at 30%, exceeding the Forest Plan standard of 5%. With proposed treatments big game cover would be reduced to 34% (3 percent decrease), which is still above Forest Plan standards. Satisfactory cover would remain at 7 percent (no change). Within areas treated, hiding cover for big game would also be provided by retaining untreated patches of forest trees throughout the project area. See detailed discussion of this concern under "Issues" in EA Part 2. Additional information can also be found in the "Wildlife" section in Part 3.]

- "[We] generally [support] fuels reduction projects that legitimately protect communities and reduce the risk of catastrophic fires—like the nearby Pine Creek WUI project in your district—but the 16-Road project does not qualify as such a project. Though the project does use prescribed burning and some small tree thinning to restore fuels to a more natural level, it also proposes more than 1500 acres of logging to "protect" the area from the spread of fire. The stress on commercial logging in this area that is nowhere near an identified community-at-risk proves this project to be a thinly veiled timber production scheme. The prescribed burning associated with the project also seems like more of a by-product of the harvest treatments, not like a means to reintroducing a more natural fire regime to the area. It does

not focus on areas that most need fuel reduction, it may lead to increased fire risk, and it builds roads in an already highly roaded area."

[The 16 Road Forest Health Project is authorized under HFRA for the following reasons: 1) Project area lands are considered part of a wildland-urban interface (WUI), because they are adjacent to an evacuation route (Forest Road 16) for an at-risk-community identified in the Grant County Community Fire plan; 2) Project- area lands contain habitat of a threatened species (bull trout). The project would reduce the threat of severe fire effects to bull trout habitat. Many of the proposed treatment areas have been managed for timber production in the past; thus roads and landings are already present. These roads and landings will be used whenever possible. No new permanent roads are proposed. Two temporary roads (approximately one mile of temporary road) may be developed to facilitate proper ground skidding. Temporary roads would not be located near streams and would be rehabilitated and closed upon completion of treatments for which they are used.. See discussion under "Healthy Forests Restoration Act—Authorized Projects" in EA Part 1.]

- "While [we agree] that reducing hazardous fuels near communities, restoring a natural fire regime, and maintaining late-successional habitat are important goals, we feel that this proposed project oversteps the intended scope of the Healthy Forest Restoration Act by treating an area so far away from any community and by proposing to commercially log more than 1500 acres. Protection from 'the risk of loss to timber' resources is not a goal of the HFRA."

[See previous response. The project area is a forested, public travel corridor identified in the Grant County Community Fire Protection Plan as containing a fire-evacuation route from an "at-risk community." The 16 Road Project Area is located approximately 37 road miles from the cities of John Day/Canyon City and 26 miles from Prairie City. The Federal Register identifies all three cities as at risk to urban interface fires. Between these Cities and the 16 Road Project are many homes with outbuildings, ranches, and cabins. Many of these dwellings are directly adjacent or intermingled with National Forest lands. In event of a wildfire the 16 Road could serve as the evacuation route for the residents of many of these dwellings].

- "The Healthy Forests Restoration Act of 2003, under SEC. 104. ENVIRONMENTAL ANALYSIS (c) CONSIDERATION OF ALTERNATIVES, states (1) IN GENERAL.—Except as provided in subsection (d), in the environmental assessment … prepared under subsection (b), the Secretary shall study, develop, and describe—(A) the proposed agency action; (B) the alternative of no action; and (C) an additional action alternative, if the additional alternative—(i) is proposed during scoping or the collaborative process under subsection (f); and (ii) meets the purpose and need of the project, in accordance with regulations promulgated by the Council on Environmental Quality.

  [We] hereby [suggest] that the agency consider an alternative for this project that does not rely on commercial harvest to reduce fuels within the project area."

  [Based on your comments, the alternative of *No Commercial Harvest* was considered. This alternative was eliminated from detailed study for several reasons. See detailed discussion under "Alternatives" in EA Part 2.]

- "There are already many roads in the project area. The project map shows at least two new temporary road segments (one nearby and parallel to road 16) to be built to facilitate

commercial logging in the project area. The proposed action does not, however, disclose the length of, necessity for, or impacts of these roads. Building these roads only puts more emphasis on this project's true objective: timber production. Fuels in the proposed units to be accessed by the new roads could be treated non-commercially (either manually or mechanically) without adding road."

[To address your comment, additional information was added to the proposed action regarding roads, landings, and proposed logging systems. See "Proposed Action (Revised)" in EA Part 2. New temporary roads are proposed at the areas shown on the map. Approximately one mile of temporary road is proposed. These roads will be rehabilitated after use. No permanent roads will be constructed. The impacts of temporary road construction and use are addressed in — EA Part 3, under virtually all of the environmental components discussed.]

- **"Fuel reduction must focus on the smallest fuels and must consider the long-term costs of maintaining treatments.**

  Recent fuel reduction modeling done by researchers at the University of Washington and published by the Rural Technology Institute provides some important lessons for the agency's fuel reduction efforts, including this project:

  1. **Thinning trees smaller than 12 inches can help reduce fire risk.** In stands that currently have moderate-to-high fire risk due to fire suppression, removing half the basal area by thinning from below resulted in greatly reduced fire risk. On typical stands in the Fremont NF, this treatment removed trees no larger than 12 inches (RTI Table 4.1, page 24). Although this modeling did not use an explicit upper diameter limit, the agency should use a 12-inch diameter limit to enhance public confidence that this project is truly about restoring fire regimes and not just another timber grab.
  2. **The ingrowth must be treated in order to retain the fuel reduction benefits of the original thinning.** If ingrowth is not treated, the model clearly showed that thinning is worse than doing nothing at all. This is because thinning stimulates ingrowth of vegetation that can act as ladder fuels. The bottom line is that the agency NEPA analysis must:
     a. Disclose whether and how ingrowth will be treated;
     b. Disclose the cumulative effects of such treatments;
     c. Disclose the uncertainties of future funding and the consequences if the ingrowth is not treated;
  3. **Removing trees over 12 inches can actually make fire risk worse than doing nothing at all.** In stands starting with moderate and high fire risk, removing trees over 12 inches and leaving trees under 12 inches resulted in much higher fire risk in 20 years. While this is not a typical treatment on federal forest lands, the lesson is that large trees should be retained, because they are fire resistant and they help suppress ladder fuels, and maintain more favorable fuel conditions below the canopy (e.g., moist, cool, less windy). …"

  [Your comment is addressed in detail in the EA Part 2, Nonsignificant Issues – Reasons. An integral part of the purpose and need is to reduce the risk of uncharacteristically intense fire behavior resulting from fuel accumulations of future bark beetle caused mortality by decreasing

the susceptibility of forest stands to bark beetle outbreaks. In order to address this purpose and need, some trees larger than 12 inches in diameter must be removed from areas where current densities pose a high risk of beetle outbreaks. Addressing this need also complements proposed fuels reduction work designed to reduce ground fuels and reduce densities of lower- and mid-level trees that can help wildfires climb and torch the crowns of upper-level trees. The impacts of the proposed action on fire risk are addressed in the "Forest Fire Hazards" section of the EA Part 3.

- **"Don't focus on reducing canopy fuels.**

  Before embarking on an aggressive strategy of crown fuel reduction, the agency must address the responsible opposing viewpoints regarding the manifold values of retaining more canopy to retain cooler temperatures and moisture. Responsible opposing experts say that reducing ground fuels and ladder fuels should be the first priority and reducing canopy fuels a lesser priority. (e.g. Jim Agee. Risk Assessment for Decision-making Related to Uncharacteristic Wildfire, Conference Portland, Oregon Nov 17-20, 2003 http://outreach.cof.orst.edu/riskassessment/presentations/ageej_files/v3_document.htm 'Reduce Crown Density • Important to address once surface fire and torching are addressed. • DON'T START HERE!!!!! … Treatments that reduced surface fuels, treated ladder fuels, and kept the big trees fared best.') An EIS is needed to respond to opposing viewpoints and consider the consequences of alternative approaches to fuel reduction."

  [See previous response].

- **"Fuel reduction thinning must retain enough trees to ensure long-term recruitment of future old-growth.**

  The Forest Service should consider some of the information from The Klamath Tribes' Dec 2003 proposed forest management plan for the Winema National Forest (http://www.klamathtribes.org/forestplan.htm), in particular the uncertainty regarding how many small and medium trees need to be retained in order to achieve desired numbers and sizes of large trees in the future. Consider [our] January 2004 comments on the Tribal forest plan:

  > We know that past logging has left us with too few big trees, and we know we want to restore complex forest with big trees. We also know that the historic density of small trees was highly variable (10-39 feet2 basal area; p.15). But we do not understand rates and distribution of tree mortality, so we do not know how many small and medium trees to save today so that we end up with the "right" number of big trees later. Goals for medium sized trees may need to be specified, although this is understandably difficult given that fire regimes have been altered, reference sites may not be available, and given our limited understanding of tree mortality rates. In stands that have few large trees and many smaller trees, the plan should explain how diameter limits less than 21 inches should be used to help restore complex forests. We must retain options by managing for variability. Effective adaptive management will be critical. …
  >
  > [We support] standards & guidelines that encourage natural regeneration and (if necessary) limited, patchy, low-density replanting (p.110). We also support the plan's intent to avoid homogenous or ubiquitous "park-like" stands across the landscape and

the critical need to retain untreated patches of small trees and brush to provide for forest complexity, wildlife cover, long-term recruitment of trees and snags, etc."

[To address this concern the proposed action was refined and specific design features, conservation measures, or monitoring requirements were added. Design features include commercial thinning prescriptions that will thin all size-classes up to 21 inches in diameter to advance stands toward open, uneven aged structure and composition similar to the historic stand types that are currently under-represented. Due to the lack of large and old trees, and current higher than historic numbers of trees in the small size classes, thinning would concentrate on thinning-from-below, removing mostly the small-diameter trees and retaining the larger diameter trees. Horizontal hiding cover will be provided by retaining non-thinned patches of forest trees as necessary throughout the project area, with emphasis on relatively flat topography and around existing snags for their further protection. See EA Part 3, especially under "Snags and Woody Debris," "Forest Vegetation," "Wildlife," and "Scenery and Recreation." See also detailed discussions of these multiple concerns under "Issues" in EA Part 2.]

- **"Disclose the effect of removing trees over 12 inches.**

  Please place a smaller diameter limit on trees to be cut. We suggest a 12-inch maximum diameter cap. The best available information indicates fire hazard can actually be increased by the removal of trees that form the canopy (generally over 12 inches in diameter). The best available information indicates that the existence of brush and trees under 12 inches tend to contribute most to fire hazard (by increasing ground and ladder fuels) whereas retention of trees over 12 inches dbh can actually reduce fire hazard. This is because brush and small diameter trees tend to have their canopies (i.e. flashy fuels) close to the ground where it can carry flames into the canopy, while trees larger than about 12 inches tend to have fire resistant bark, greater "ground to crown" distances, and the canopy of the larger trees provides shade which maintains fuel moisture, reduces wind speed, and suppresses the growth of ladder fuels, which results in reduced fuel hazard and reduced costs of maintaining favorable fuel conditions. See C. Larry Mason, Kevin Ceder, Heather Rogers, Thomas Bloxton, Jeffrey Comnick, Bruce Lippke, James McCarter, Kevin Zobrist, Investigation of Alternative Strategies for Design, Layout and Administration of Fuel Removal Projects; Rural Technology Initiative; July 2003; http://www.ruraltech.org/pubs/reports/fuel_removal/ If the agency thinks the tipping point is not at approximately 12 inches dbh, please provide a sound scientific basis for a different diameter limit. Absent a sound justification the agency risks making an arbitrary and capricious decision."

  [See previous responses. The effects of the proposed actions on fire hazard, fire regime and condition class, surface fuels, canopy fuels, and expected fire behavior were analyzed. See the "Forest Fire Hazards" section of the EA Part 3].

- "Thinning for fuel reduction results on a U-shaped response curve.

  - A little thinning (removing small trees (<8" dbh) and brush from the ladder fuel and surface fuel zones) almost always reduces fire hazard and (as long as activity fuels are treated) rarely increases fire hazard,
  - With a little more thinning the fire hazard benefit flattens out. Removing trees <8" dbh up to 12-14" dbh eliminates some small fuels (which has a positive effect on fire hazard)

but also reduces the canopy (which has a negative effect on fire hazard because it creates more slash, reduces fuel moisture, increases wind speed, and stimulates the growth of ladder fuels),

- Then at some point any more canopy removal (thinning trees over ~12" dbh) actually increases fire hazard in direct conflict with the National Fire Plan, the HFI, the HFRA, and the purpose and need of this project.

Where does this project fall on the U-shaped curve? The NEPA analysis must disclose this."

[See previous responses. See EA Part 3, especially under "Forest Fire Hazards." See also detailed discussions of these concerns under "Issues" in EA Part 2.]

- "ENSURE MEANINGFUL PUBLIC PARTICIPATION: If the public is well-informed and meaningfully involved in project development, it is much more likely to be implemented smoothly. …"

  [The Forest provided the public with two formal invitations to participate in the project. These include a collaboration meeting held in September, 2004; and a scoping request in February, 2005. At any point during the life of the project, the public can participate. This includes project development, decision-making, and implementation. See related discussions in EA Part 1 under "Collaboration—Project Development" and in EA Part 2 under "Project Proposal—Public Review and Comments."]

- "PRIORITIZE TREATING HIGH RISK AREAS STARTING IN THE COMMUNITY ZONE: As directed by the National Fire Plan, and given limited resources, agencies must prioritize treatment of fuels in areas that will have the greatest gain in terms of protecting homes and communities, specifically "high-risk" rural communities with more than 250 people per square mile (USDI/USDA 2001). …"

  [See related discussions in EA Part 1 under "Project Purpose and Need for Action," "Collaboration—Project Development," "Current Conditions," and "Desired Conditions."

- "ENSURE FUEL REDUCTION TREATMENTS ARE EFFECTIVE: Fuel treatments can be effective in reducing fuel and fire hazard, but poorly designed and located projects can actually make fire hazard worse instead of better. …"

  [This comment is addressed in the proposed action design; and was used to help determine the subject matter that is discussed in the analysis of impacts—EA Part 3, especially under "Forest Fire Hazards."]

- "INCLUDE ENVIRONMENTAL SAFEGUARDS: Fuel reduction is only one aspect of managing forests and restoring fire-adapted ecosystems. To be successful, fuel reduction treatments must fit within a sound ecological restoration framework. Treatments must be conducted in a way that protects and restores diverse resource value such as clean water, soil productivity, wildlife habitat, recreation, scenic qualities, etc. Employing adequate environmental safeguards as the surest way to avoid controversy and conflict over fuel reduction thinning projects. …"

  [This comment indicates components of the environment that may be affected by the proposed action and factors affecting them; and was used to help determine the subject matter that is

discussed in the analysis of impacts—EA Part 3, under virtually all of the environmental components discussed.]

- "USE RATIONAL AND INFORMED DECISION-MAKING: The National Environmental Policy Act offers an essential methodology for involving the public and making well-informed decisions. Taking short-cuts will alienate the public and lead to poor decisions. …"

  [See previous response regarding public involvement in the project. See also related discussions in the Document Summary at the front of this EA, in EA Part 1 under "Collaboration—Project Development," and in EA Part 2 under "Project Proposal—Public Review and Comments."]

- "ENSURE ADEQUATE FUNDING – Removal of the small fuels costs money and does not generally pay for itself. Effective fuel reduction efforts are therefore best viewed as investments in community safety, not economic development programs. …"

  [See related discussions in EA Part 1 under "Project Purpose and Need for Action," "Collaboration—Project Development," "Current Conditions," and "Desired Conditions."]

- **"Fish & Wildlife –** Special status species surveys must be completed prior to developing NEPA alternatives and before the decision is determined. On-the-ground field reconnaissance surveys must be done and used to develop NEPA alternatives."

  [The EA Part 3 ("Wildlife") identifies the threatened, endangered, and sensitive species (TES), management indicator species (MIS), featured wildlife species, and a variety of landbird species known or suspected to be within the project area. Species presence/absence determinations were based on habitat, wildlife surveys, recorded wildlife sightings, observations made during reconnaissance, non-Forest Service databases, and status/trend and source habitat trend documented for the Interior Columbia Basin. Formal wildlife surveys were not conducted for most species; rather, habitat and observational data served as the primary source for determining species presence. Wildlife discussions address habitat both within and adjacent to the project area. The EA discloses where and when formal surveys have been conducted Management Indicator Species discussions include population status/trend and source habitat trend information. Additional information is available in the "Terrestrial Wildlife Report" and "Biological Evaluation/Assessment of Threatened, Endangered, Proposed and Sensitive Species". These documents are located in the project record.]

  Prairie City Ranger District, Oregon Department of Fish and Wildlife, Bureau of Reclamation, and the Burns Paiute Tribe began a life history study for bull trout on the North Fork Malheur River population in 1998. This information is reference in the analysis. Aquatic species known or suspected to be within the project area and Crane Creek subwatershed are identified in the EA Part 3 "Fisheries and Amphibians". Additional species status/trend information is disclosed in the "Biological Assessment/Biological Evaluation Fisheries Report" located in the project record. Formal stream surveys were completed on Crane Creek and Halfway Creek in 2005. Survey information was used to determine existing habitat conditions and is referenced in the analysis.

- **"Water Quality –** Project analysis should separately discuss Riparian Management Objectives (under PACFISH and INFISH) and how the proposed alternatives will impact these objectives. Any commercial harvest activities or road construction in key watersheds or municipal watersheds should be avoided in order to protect water quality."

[PACFISH does not apply to this project. Anadromous fish are not present in the project area or analysis extent for fisheries. The project area is not located in a municipal watershed. The EA tiers to the analysis of the amended Malheur Forest Plan, including the Inland Native Fish Strategy (INFISH). Riparian Management Objectives under INFISH are addressed in the EA. —See EA Part 3, especially under "Soil and Water" and "Fisheries and Amphibians. See related discussions in EA Part 2 under "Scope of the Environmental Analysis."]

- **"NEPA Documentation –** A full range of action alternatives should be considered for this project. These alternatives should include wildlife enhancement, restoration, old growth protection (minimum fragmentation), and non-motorized recreation."

  [This comment concerns the scope of the environmental analysis, which the Forest Service considers effectively and adequately addressed by this EA. See detailed discussions of all elements of "scope" in EA Part 2, under "Scope of the Environmental Analysis."

- **"Roads EA –** The Forest Service is required to justify the need for new roads and prioritize efforts to maintain and decommission roads considering environmental and economic implications. (The EA must clearly state whether any roads are proposed for construction or reconstruction within Riparian Reserves, and which of these if any will require stream crossing(s).)"

  [Based on your comment more detail was added to the proposed action regarding road activities. To clarify, no new permanent road construction is proposed. Less than a mile of temporary road is proposed. Temporary roads will be rehabilitated after use. Temporary roads would not be located in riparian areas and do not require stream crossings. See "Proposed Action (Revised)" in EA Part 2. Your comment was also used to help determine the subject matter discussed in the effects — See EA Part 3.]

END OF COMMENTS

Appendix B: Combined List of Design Features, Conservation Measures, and Monitoring Requirements

Design Features and Conservation measures

Roads

- The project would not involve any construction of new permanent roads or other new permanent infrastructure.
- The project would not involve any changes to current access management unless required to meet particular resource management standards.
- Existing roads used for proposed treatments would have any current drainage problems repaired and would be brought up to normal maintenance standards prior to log hauling.

- If any temporary roads are developed for access of workers or equipment, they would be located outside of riparian habitat conservation areas (RHCAs)—areas near streams or other water—and rehabilitated and closed upon completion of treatments for which they are used.
- If any existing roads in the area that are currently grown over or closed by earth berms are used for firelines or temporary access of workers or equipment, they would be rehabilitated and closed again upon completion of treatments for which they are used.
- Road rehabilitation may involve a combination of treatments that could include reshaping, "subsoiling," planting, seeding, or placing woody debris on the rehabilitated surface to help stabilize soil and discourage unauthorized use.
- Use of any developed water sources for road maintenance work would conform to all applicable standards or Best Management Practices.
- The gravel source for road maintenance work would conform to all applicable standards or Best Management Practices.

Forest Fire Hazards

- Firelines needed to conduct the proposed treatments shall consist of natural breaks, existing roads, or hand-constructed lines. Hand-constructed firelines may be used to keep fire out of sensitive areas such as historic sites or private property.
- Private property will be avoided and protected from prescribed fire by isolating or separating it from areas to be treated. This may be accomplished by constructing firelines, planning ignitions to stop at effective control points such as roads or natural barriers, staging firefighters or firefighting equipment at strategic points, or other means.
- The Forest Service will take steps to notify adjacent landowners in advance of planned burn operations.
- In the event of fire moving onto private property, aggressive fire suppression tactics will be used.
- A prescribed burning job hazard analysis has been developed that outlines known hazards and measures to avoid accidents involving the public. The extent to which these measures will be used is dependent upon the degree of exposure to the public. Measures may include but are not limited to the following:
    - Signs may be placed on affected roads to inform visitors to the area of a prescribed fire.
    - If roads must be closed during burn operations they will be signed and notification of this action will be made through Malheur Dispatch.
    - The Forest Service will take steps to inform the general public through radio, newspapers or other means of planned burn operations and the need for the burning.
- As part of the plan for retention of logs and snags, protection measures shall be used during prescribed underburning to reduce consumption of these large woody fuels needed for wildlife habitat.

Air Quality

- In compliance with the Clean Air Act, burning of any kind will not occur unless prior approval is granted by Oregon Department of Forestry. The Clean Air Act sets air quality standards for particulate matter (PM) for particles less than 10 microns in diameter (PM10) and less than 2.5 microns in diameter (PM2.5—the main concern for human health). All amounts of PM10 and PM2.5 emissions will be calculated using the CONSUME software in

the Fasttracks reporting system, which is also submitted with planned burn operations to the Oregon Department of Forestry to determine compliance with the Clean Air Act.

- Even though no visibility-protection periods have been set for wilderness Class 1 airsheds in Eastern Oregon, all burning will occur outside visibility-protection periods set for Central Oregon of July 1 to September 15.
- Burning should be planned for times when transport winds are sufficient to displace much of the smoke from the area.

Soil and Water

- To minimize soil disturbance, skid trail and landing locations would be approved in advance by the Forest Service.
- Mechanized harvesters or ground-based skidding equipment would not be permitted on areas with sustained slopes steeper than 35 percent (about 20˚).
- Existing skid trails and landings would be used where feasible and approved.
- Skidding plans would avoid skidding down swales and draws, and where necessary and allowed, cross such features perpendicular to the draw bottom.
- On slopes greater than 20 percent, upon completion of harvest or other mechanized activities in individual treatment areas, skid trails or equipment trails would be treated for erosion control using "waterbars," seeding or other treatments deemed necessary by the contract administrator to promote soil stability. For skid trails lacking in cover after use, woody debris would be placed on skid trails before closing the units to reduce erosion and discourage future unauthorized use.
- Logging would take place in the winter when sufficient snow is present to prevent compaction or disturbance to the soil surface. Specific acceptable conditions to meet soil objectives would be detailed with a winter logging agreement between the Forest Service and the contractor(s).
- Where fuels are to be machine-piled, piling would occur using equipment with a grapple and boom when soils are dry, frozen, or snow-covered. Equipment will walk on slash during operations as much as possible.
- No machine-piling would occur on slopes steeper than 35 percent (about 20 degrees).
- RHCA buffer widths listed in Table 4 would be applied.

Table 17. RHCA widths

Type of RHCA	RHCA Width (Feet)
Category 1 - Fish-bearing stream reaches	300
Category 2 - Permanently flowing, non-fish stream reaches	150
Category 3 - Ponds, lakes, reservoirs, or wetlands larger than 1 acre	150
Category 4 - Seasonally flowing or intermittent stream reaches, wetlands smaller than 1 acre, landslides, and landslide-prone areas	100

- During layout, if questions about RHCAs arise or additional streams are found, the layout crew would consult with the project or district hydrologist and adjust RHCAs accordingly.

- No treatments, skid trails, landings, piled slash, or off-road wheeled or tracked equipment would be located within RHCAs. During underburning, no ignitions would take place within the RHCAs. However, fire would be allowed to back into the RHCA buffer to remove some of the smaller conifers and allow recovery of remnant hardwood shrubs.
- Any safety-hazard trees felled in RHCAs would be left on-site.
- Log hauling will be completed primarily on frozen or snow covered roads effectively eliminating the need for water sources for dust abatement activities. If limited hauling occurs outside of the winter period, hauling is limited to dry roads to minimize rutting and sediment runoff. If dust abatement is needed it will follow the requirements of the fisheries biological assessment and biological report.
- Underburning would be conducted when soil, duff, and large fuel are moist in order to retain beneficial duff as ground cover to prevent erosion and meet forest standards for ground cover.
- Where large pile burning occurs, areas would be seeded with weed-free seeds.
- "Subsoil" and re-vegetate with trees or grass all landings where feasible.
- In all treated areas the minimum woody-debris and ground cover listed in Tables 4 & 5 would be retained through all phases of the project where they currently exist. Since much of the landscape is deficient in down logs, most existing large down logs (logs greater than 12 inches) would be retained during harvest and grapple piling activities.
- Protection of large logs will be an objective during underburning activities.

Table 18. Minimum woody debris standards

Forest Type	Minimum Diameter	Number of Logs/Acre	Minimum Length	Total Linear Feet/Acre
Ponderosa Pine	12 inches	3-6	6 ft	20-40 ft
Mixed Conifer	12 inches	15-20	8 ft	120-160 ft

- All disturbed soil occurring between 100 and 200 feet away from a stream or further than 200 feet that could erode into a stream would be seeded. Seeding of additional disturbed areas would be performed to forest standards.
- A project map would be provided for implementation showing buffer width requirements and minimum ground cover requirements for all units.
- Skid trails and disturbance near RHCAs would be monitored for erosion control for two years after project activities are completed and reseeded if necessary.

Table 19. Minimum required ground cover after management activities

Soil Erodibility	First Year %	Second Year %
Very High	60-75	75-90
High	50-60	65-75
Between Moderate & High	45	60

Soil Erodibility	First Year %	Second Year %
Moderate	38	50
Between Low & Moderate	30	40
Low	20	30

Unit-Specific Design Features

Based on conditions found during fieldwork, these design features were added:

- Unit 9 – Prohibit skidding across main draw.
- Unit 11 – Prohibit skidding across draw in southwest corner of section 20.
- Unit 30 – Buffer springs (100 ft) as far as channel is visible. Springs do not flow out of unit.
- Unit 49 – Prohibit skidding across main draw.
- Unit 51 – An additional category 2 stream was found and will be buffered with RHCA and avoided.
- Road 1600861 is soft near where unit 11 and 39 meet due to springs on the road. Upgrading and additional surfacing needed before winter use.

Snags and Woody Debris

Detailed project design features and conservation measures for snags and woody debris are specified either under Wildlife or Soil and Water. They are summarized here.

- Proposed treatments would manage dead tree (snag) habitat to provide 100 percent of the potential populations of primary excavator wildlife species throughout stand rotation as per Forest Plan standards. Since conditions are generally below Forest Plan standards all "commercial harvest and precommercial thinning activities would retain existing snags greater than or equal to 12 inches DBH except where they create a safety hazard. Standing dead trees, which present a safety hazard, would be felled and left in place."
- Proposed treatments would retain or provide, at a minimum, the average densities of large woody debris by forest type outlined in Table 5 in the Soil and Water section. Prescribed fire parameters will be designed to limit the burning of large down logs to a point where their diameter is reduced by no more than a total of 3 inches.
- Snag and down wood monitoring will be completed after implementation to validate snag and down wood assumptions and modeling used during the analysis.

Forest Vegetation

- **HTH (Commercial Thinning).** Goals for thinning treatments involve reducing bark beetle risk, and advancing the forest in this area toward achieving the historical range of variability in stand structures as soon as possible. In general, the commercial thinning treatments would involve cutting trees between 7 and 21 inches DBH and would favor retaining seral species (those typical of the stages of forest succession in this area—ponderosa pine, western larch, quaking aspen) over climax species (those that would eventually dominate these sites in the absence of periodic or stand-replacing fires—Douglas-fir, grand fir). Exceptions to this are noted below. No snags greater than 12 inches DBH would be removed except for safety and implementation (e.g. road construction) reasons.

- Where the stands contain trees of a variety of sizes (uneven-aged), the commercial thinning would thin all size-classes up to 21 inches DBH to advance stands toward an open, uneven-aged structure and composition similar to the historic stand types that are currently under-represented. Due to the lack of large and old trees, and current higher than historic numbers of trees in the small size classes, thinning would concentrate on thinning-from-below, removing mostly small-diameter trees and retaining the larger diameter trees. In stands that have greatly changed from the historic dominance by seral species to dominance by grand fir, the desire to retain the more fire-tolerant seral species would mean that in places, some of the larger grand fir trees up to 21 inches DBH would be removed to favor retaining smaller seral species trees.
- In stands that have been converted to a more uniform-sized and even-aged structure, the commercial thinning would thin from below to retain the largest seral species trees. Although the thinning would alter the stands toward dominance by ponderosa pine, attempts would be made to retain a mixed-species composition similar to historic stands. In many stands, the trees are relatively evenly spaced. During commercial thinning in these stands, one group of 3-5 closely spaced ponderosa pine trees would be retained for every two acres to create future small clumps of large trees typically found in ponderosa pine stands subject to frequent, low-intensity and low-severity fires.
- Within the visual foreground of Forest Road 16, tree spacing would be deliberately varied widely to retain a more non-uniform and unmanaged appearance.
- In Unit 23, the thinning would be modified to maintain habitat for pileated woodpeckers. In this unit, all grand fir less than 21 inches DBH would be removed from within 50 feet of trees greater than 21 inches DBH. Seral species trees within 50 feet of trees greater than 21 inches DBH would be thinned. Fifteen percent of the stand area would be retained unthinned in patches of about one-quarter acre in size. The unthinned patches would, as much as possible, include medium-sized trees. Outside of the unthinned patches, the smaller trees would be precommercially thinned.
- Units 8, 9, 10, 23, and 25 contain travel corridors between late- and old-structure stands. Travel corridors should be at least 400 feet in width (USDA 1995d) and are mapped. Thinning within the corridors would be adjusted to not reduce canopy cover to less than 66 percent of site potential as required by Regional Forester's Forest Plan Amendment 2 for travel corridors.
- Diseases of concern in the 16 Road project area include two strains of annosus root rot (Heterobasidion annosum) that affect conifers found in the area. The S strain mostly infects true firs, and the P strain mostly infects pines. Annosus spreads over long distances by spores, and over short distances from tree to tree through root contact. Tree cutting can increase the spread of annosus by providing fresh-cut stump faces for the spores to land on and infect. Both strains of annosus root rot can be found in the project area.
    - Integrated pest management activities to prevent the spread of annosus include the use of a borax-based product (sodium tetraborate decahydrate or disodium octaborate tetrahydrate) such as Sporax to treat freshly cut tree stumps, and the management for non-host tree species in areas of known root rot centers.
    - To prevent the spread of annosus due to tree cutting in the 16 Road project, a borax product (Sporax) should be applied to all cut ponderosa pine or lodgepole pine stumps over eight inches in cut-face diameter if the trees are cut with mechanical shearers or 12 inches in cut-face diameter if the trees are cut with chainsaws. In proposed Unit 23, grand fir stumps should also be treated. The

stumps should be treated within 24 hours of cutting. During winter logging, exceptions to treating stumps should only be made if the stumps are covered with snow before the borax treatment can be made.

- Within the 16 Road project area, borax application will be approximately one pound per treated acre, but will vary from stand to stand depending upon the number of trees removed and tree sizes.

- **SPC (Precommercial Thinning).** Depending upon tree sizes and stocking levels of individual stands, precommercial (noncommercial) thinning would occur following a commercial thinning, or as the primary stocking control treatment, or not at all. Precommercial thinning involves the cutting of trees less than 7 inches DBH. The precommercial thinning would advance stands toward historic stocking levels, size- and age-class composition, and species composition. During precommercial thinning, one small group of 3-5 closely spaced ponderosa pine trees would be retained every two acres to create future small groups of large trees. Within visual foreground of Forest Road 16, tree spacing would be deliberately varied widely to retain a more non-uniform and unmanaged appearance. Unit 41 contains a travel corridor and the thinning would be adjusted to not reduce canopy cover to less than 66 percent of site potential.
- **FHB (Fuels Reduction Hand Pile and Burn).** This is a type of prescribed fire where down woody material is cut into smaller sized pieces, arranged in piles, and burned later.
- **FUB (Fuels Reduction Underburn).** In this treatment, low-intensity prescribed fire would be used to reduce down woody fuel loadings, reduce stocking in small-diameter trees, and raise crown heights by killing lower tree branches.
- **LS (Lop and Scatter).** Lop: to chop branches, tops, and small trees after felling into lengths so that the slash will lie close to the ground. Scatter: to spread the lopped slash more or less evenly over the ground. This treatment is used to modify fire behavior by dispersing concentrations of down woody fuels and compacting the fuel bed.
- **WT (Whole Tree Yarding).** In this treatment, felled trees are transported from the woods with their crowns attached. It is generally used to reduce post-timber-harvest, down-woody fuel loadings by removing the treetops and limbs to collection areas where they can be burned or utilized as posts and poles or chips.
- **Quaking Aspen Restoration.** Aspen stands would be identified for protection or special enhancement treatments on an individual-group or clone basis, within the proposed treatments for reducing fuel hazards or bark-beetle risk that apply to the larger, surrounding stand. These protection and enhancement measures would follow forestwide direction and standards (Forest Plan Chapter IV, p. 31 item #57). Presently, 29 aspen sites totaling 68 acres are identified for treatment within the project area and specific protection or enhancement measures have been developed for each site. *General* design features and conservation measures that apply to these sites are as follows:
  - All aspen sites would receive protection (fencing, according to detailed specifications for each site) prior to or immediately after any treatment(s) to ensure new sprouts are protected from negative impacts caused by elk, deer, or cattle grazing. If individual aspen stands cannot be protected there should be no other treatments within them.
  - Low-intensity fire would be allowed to creep into RHCAs where associated burning treatments are proposed. Aspen stands inside these areas would be protected using various fencing or caging applications.
  - To reduce competition between conifers and aspen (outside of RHCAs), all conifers less than 21 inches DBH inside aspen stands and within 100 feet of mature aspen stems

would be cut and removed. For each retained conifer greater than 21 inches in diameter within the area, two additional trees of differing sizes that are less than 21 inches would also be retained. Tree felling and removal operations would be conducted so as to minimize damage to existing aspen clumps. Where necessary, methods such as directional hand felling, and cable winching of downed trees would be used. Commercial and precommercial slash material would be removed within and to a distance of 15 feet away from any existing aspen stems. A low-intensity prescribed burning treatment would be applied to these stands.

  - Treated aspen stands should be monitored for 3 to 5 years to ensure protective fencing has not been damaged.

- **Shrub Restoration.** Significant communities of mountain shrubs would be maintained or enhanced (Forest Plan Chapter IV, p. 28, item #32). These areas would be identified during pre-implementation surveys, flagged, and avoided or protected as follows:
  - No treatment would occur on open area scabland where mountain mahogany stands are present within the project area.
  - In areas where mountain mahogany is an understory component of a heavily stocked pine overstory, directional felling of trees away from these remaining mountain mahogany individuals should be implemented to minimize damage to remaining individuals. If burning is proposed in the area, collect viable mature seeds prior to burning for use in revegetation in the event that fire is detrimental to remaining individuals. A very low intensity fire should only be used in these areas.

Wildlife

The proposed action involves the following wildlife special features:

- To conserve habitat for a broad variety of animal life that depends upon wood on the forest floor, proposed treatments will retain or provide, at a minimum, the average densities of large woody debris by forest type outlined in Table 5 in the Soil and Water section. Prescribed fire parameters will be designed to limit the burning of large down logs to a point where their diameter is reduced by no more than a total of 3 inches.
- To conserve habitat for primary cavity excavators, which are management-indicator species of the Malheur National Forest, proposed treatments would manage dead tree (snag) habitat to provide 100 percent of the potential populations of primary excavator species throughout stand rotation as per Forest Plan standards. Since conditions are generally below Forest Plan standards all “commercial harvest and precommercial thinning activities would retain existing snags greater than or equal to 12 inches DBH except where they create a safety hazard. Standing dead trees, which present a safety hazard, would be felled and left in place.”
- To conserve habitat of the goshawk, a featured species of the Malheur National Forest known to use habitats of mature and old forest structure, no treatments involving timber harvesting or other cutting are proposed in suitable nesting habitat around existing goshawk nests. Specifically, 30 or more acres of the most suitable nesting habitat surrounding each active and historical nest tree are deferred from any cutting. Additionally, 400-acre post-fledging areas surrounding goshawk nests will be treated so as to enhance goshawk prey conditions and advance these stands toward late or old structure conditions. Project activities will be prohibited in occupied goshawk territories (fledgling areas and within ½ mile of a known occupied nests) between April 1 and September 30 to avoid possible disturbance of goshawk pairs while bonding and nesting.

- To conserve nesting habitat of raptors (birds of prey), a biologist would be consulted to establish a nest zone buffer around any raptor nest discovered prior to or during project layout, and, if appropriate, to restrict activities within the nest area during occupancy, according to requirements of the species involved.
- Maintain the nest trees of active raptor nests and immediately surrounding habitat and avoid or reduce potential adverse impacts from management activities during the nesting season. Protection measures will be developed based on site characteristics and biological needs of the species. Where possible, retain trees with inactive nests that may be important to secondary nesters (e.g. great gray owl).
- For protection of bald eagles, refer to the Pacific Bald Eagle Recovery Plan for direction. Upon discovery of an active nest, suspend all management activities that could alter site characteristics, or disturb the birds until the nest site is evaluated by a wildlife biologist.
- To conserve habitat of big game species including elk, a management-indicator species of the Malheur National Forest, standards of habitat-effectiveness index and satisfactory and marginal cover will be met.
- Horizontal hiding cover will be provided by retaining non-thinned patches of forest trees as necessary throughout the project area, with emphasis on relatively flat topography and around existing snags for their further protection.
- Connectivity corridors between potential “late and old structure” (LOS) stand conditions and between all Forest Plan designated “old growth” will be maintained to meet Forest Plan Amendment #2 wildlife standard. Amendment #2 gives direction for maintaining connectivity between these habitats to allow the free movement of old-growth-associated terrestrial wildlife species. LOS and dedicated old growth stands are distributed throughout the Crane Creek subwatershed; there is not, however, any dedicated old growth or replacement old growth in the project area itself.
- To conserve potential “late and old structure” (LOS) stand conditions in the project area and connectivity between such stands both within and adjacent to the project area, proposed thinning or burning in stands exhibiting LOS or connection-corridor potential will be specifically designed and controlled to enhance and accelerate the development of LOS values.
- Canopy closures within treated connectivity corridors will be maintained within the top one-third of site potential.
- To conserve the integrity of unique habitats, a 100 foot buffer of cover will be maintained around a den site, elk wallow, bog or seep etc., should one be discovered during project layout.
- Maintain grouse winter roost habitat. The preferred habitat is clumps of mistletoe-infected Douglas-fir on tops or upper slopes of ridges.

Fisheries and Amphibians

Special features of the proposed action directly applicable to conservation of fisheries and amphibians are all of those listed under Roads, and Soil and Water. Additionally, the following design feature from Forest Fire Hazards directly applies:

- Firelines needed to conduct the proposed treatments shall consist of natural breaks, existing roads, or hand-constructed lines. Hand-constructed firelines may be used to keep fire out of sensitive areas such as historic sites or private property.

The emphases of the above-referenced special features applicable to fisheries and amphibians can be summarized as follows: 1) To limit soil-surface disturbance especially near streams, 2) To avoid or control sediment transport to watercourses, 3) To conserve native vegetation and large woody debris in streamside or other riparian areas (Riparian Habitat Conservation Areas—RHCAs), and 4) To maintain streamflows to within normal seasonal ranges.

Noxious Weeds (Invasive Plants)

- Heavy equipment would be cleaned prior to coming on National Forest System Lands. Specifically, equipment used within known locations of invasive-plant infestations should be cleaned prior to moving to another site within the forest or area treated last.
- Seed, straw, and other materials used for road decommission and erosion control would be certified weed-free.
- Use only gravel, fill, sand, and rock that are judged to be weed-free by District weed specialists if needed for project.
- All disturbed roads, landings, and skid trails would be seeded with a native seed mix after activities occur.
- Native plant materials are required for revegetation unless accepted extenuating circumstances are identified. See Standard # 13 in Record of Decision—Pacific Northwest Region Final EIS for the Invasive Plant Program, 2006.

Sensitive Plants

- Those pertaining to *riparian areas* (or *RHCAs*) listed under Soil and Water. These provide for establishment and protection of riparian habitat that coincides with potential habitats of various sensitive plant species.
- All of the special features listed under Noxious Weeds. These are provided to prevent weed establishment or expansion that could invade sensitive plant habitat.

Additionally, the following features specific to sensitive plants apply:

- Pre-implementation plant surveys will be conducted by qualified personnel under the supervision of the district botanist (Forest Plan Forest-wide Standard # 66).
- If sensitive plants are found in areas where ground-disturbing activities are proposed, these areas will be flagged and avoided.
- If sensitive plants are found in areas where prescribed burning is proposed, the district botanist and the Biological Evaluation will be consulted concerning fire adaptation of species involved. If burning is approved as a result, the consultation will include specifying the allowable burn period(s).
- Sensitive plant populations in burned areas will be monitored annually for 1 to 3 years following treatment.
- If sensitive plants are found within grazing allotments, and populations are in habitats that are negatively impacted by grazing, these areas should be protected with fencing.

Livestock Grazing

- **R-1:** Grazing may resume in the area of the burn without any timing restriction if burning occurs before vegetative green-up. If burn occurs after green-up, grazing may occur after range has been determined to be ready (verified by resource personnel) or in the fall September to October without a range readiness determination.

- **R-2:** If areas are deemed to be in need of protection, grazing may resume in the grazing unit if areas can be adequately protected from grazing (i.e., electric fencing, placing supplements away from burned areas, or other protection methods).
- **R-3:** If burns occur in areas not suitable for grazing as determined by the range resource specialist, grazing may continue in the remainder of the unit that was not affected by the burn if it is suitable for grazing.
- **R-4:** If burned areas cannot be protected as described in design features R-2 through R-3, then livestock may need to be moved to another allotment or unit. The purchase of supplemental feed to replace the affected forage loss may also be considered.
- **R-5:** All fences damaged because of project activities would be repaired prior to returning grazing animals to the project area. Repair to any damaged, developed springs would also occur.
- **Monitoring:** Distribution and utilization monitoring should be done annually for 2 to 4 years post-project across the area affected by the project activities.

Forest Products Economy

(No special features, beyond the basic project design)

Scenery and Recreation

- Unit Design and Layout—General Requirements Applicable to All Areas:
    - To avoid ground-disturbing activities visible from FR 16, winter logging is required.
    - If any recreation special-use permits are issued for the project area during treatment operations, users would be informed of operations in the vicinity and possible hazards that may be encountered through proper signage or other means.
    - In order to blend treatment units and create free-form vegetation patterns that mimic natural patterns, straight lines and geometric shapes for unit boundaries would be avoided or minimized.
    - If necessary, unburned slash in the foreground area within 150 feet of FR 16 would be scattered to reduce the color contrast of any exposed soil at burn-pile sites.
    - No boundary paint would be used parallel to FR 16. Boundaries running horizontal to this road will have tags, flagging and boundary paint.
    - Tree or shrub islands of various shapes and sizes would be retained in a random distribution pattern where possible, to provide a characteristic vegetation appearance while meeting objectives for fuel reduction and bark-beetle risk reduction.
- Immediate Foreground Design and Layout—Specific Requirements Applicable to Certain Areas:

    The following design features are specific to treatment areas that fall within the immediate foreground of scenery or recreation sites such as the 16 Road and all snowmobile routes. The immediate foreground is 300 feet from scenic corridor boundary into the project area or 150 feet on either side of a recreation site. The following design features apply to the first 150 feet unless otherwise stated:

    - On slopes facing Forest Road 16, slash-burn piles will be placed up to 50 feet away from the road where practicable, to reduce visual impacts

- In the 150-200 foot zone away from the center point of FR 16, slash would be removed, grapple-piled and burned, or hand-piled and burned.
- Stumps would be cut flush or close to the ground where practicable and always within 6 inches of the ground on the uphill side.
- If after one year pile-burned sites are visible from the 16 Road, re-burning, scattering, covering with natural duff, or masticating burned piles would be accomplished in order to minimize visual impact of management activities.
- In travel corridors, temporary roads leading to landings would not be located perpendicular to FR 16 or recreation areas in order to minimize the forest visitor's direct views into landings. Where practical and warranted to reduce scenery or recreation-use conflicts, landings would be located off system roads.
- Where practical, avoid placing skid trails within 100 feet of FR 16.
- Skid trails should be placed at different angles to each other and roads.
- Any snowmobile routes that conflict with project activities will be signed with proper signage and alternate routes will be utilized during the implementation of the project. Signage will be coordinated with the local snowmobile club.
- The Malheur National Forest Road Rules will apply during commercial log hauling. These rules will be included in the timber sale contract, and regulate conditions to which the road must be maintained.
- Within the foreground areas in the harvest units, a mosaic of stocking levels and tree sizes will be retained. Avoid creating abrupt transitions between thinned and unthinned stands in the foreground.
- Marking paint observed from FR 16 is to be applied to the side of the tree facing away from the road. Ribbon and signs in this 150-foot zone are to be removed upon completion of the harvest unit activities.
- Prior to harvest, the locations and clearing for all temporary roads and landings within 150 feet of FR 16 will be reviewed by a landscape architect or recreation specialist. Harvest activities in this zone must maintain a slightly altered landscape. The ground disturbance must be minimal and the size and number of landings in the zone must be minimized. If the burning of the landing piles in this zone will cause more than 20 percent tree mortality surrounding the piles, consider either chipping or hauling the slash to a disposal area.
- Burning prescriptions in visual foreground areas would be developed to produce low intensity fire, minimizing damage to the larger-diameter overstory trees. Those trees greater than 21 inches DBH within 200 feet of FR 16 would be protected from high intensity flames that could cause mortality. This protection could include such activities as raking needles away from the base of trees or wetting down the area around the tree prior to ignition. Burning intensities will be controlled by ignition methods and techniques to retain a minimum of 80 percent of the live crowns. Isolated small trees within a stand of larger trees may end up having less than 80 percent of the live crown remaining.

Cultural or Historical Resources

- All NRHP-eligible and potentially eligible (unevaluated) sites will be avoided or protected from any ground-disturbing impacts during all timber harvest activities.

- There will be no piling of slash or woody debris, either by hand or with ground-based machines, within the boundaries of any site; all hand-piling and burning of slash or fuel concentrations will take place outside of the site boundaries.
- All eligible and potentially eligible (unevaluated) historic properties with structural remains or other wooden feature types will be avoided or protected during all burning activities. Eligible historic remains will be identified on the ground and proper protection measures will be conducted during the burning activities.
- Under the terms of the Management Strategy for the Treatment of Lithic Scatter Sites (Keyser et al. 1988), low-intensity burning will have no effect on the prehistoric lithic assemblages.
- Sites will be monitored during implementation of project activities.
- If cultural resources are located during implementation of the action alternative, work will be halted and the District Archaeologist will be notified. The cultural resource will be evaluated and an impact-avoidance plan developed in consultation with the Oregon SHPO, if necessary.

Monitoring Requirements

- Snag and down wood monitoring will be completed after implementation to validate snag and down wood assumptions and modeling used during the analysis.
- Tree marking and unit layout will be monitored to ensure compliance with the silvicultural prescriptions and marking guide.
- Invasive-plant inventory and monitoring should be done annually for 3 to 5 year post-project on all open and closed system and temporary roads affected by the project activities.

Appendix C: Other Past, Present, and Reasonably Foreseeable Future Actions Related to the Proposed Action

This appendix identifies and briefly describes some important events or management actions in or near the 16 Road Forest Health project area. This listing is consistent with the Council on Environmental Quality guidance letter of June 24, 2005; these events or actions were found to be relevant to cumulative-impacts considerations for one or more of the resources or environmental components that the proposed action would affect. Cumulative impacts are those impacts that result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions (40 CFR § 1508.7). These "related actions" may be influencing environmental conditions in the same spatial area and timeframe that the proposed action would affect. If so, any currently existing (or foreseeable) effects of these other actions, especially adverse effects, are relevant to considerations of whether the proposed action would add to their effects.

For each related action or group of related actions identified below, the cumulative-impacts analyses in which they were considered are noted according to the relevant components of the affected human environment, e.g., **[Forest Fire Hazards, Air Quality, Soil and Water, Snags and Woody Debris, Forest Vegetation, Wildlife, Fisheries and Amphibians, Noxious Weeds, Sensitive**

Plants, Livestock Grazing, Forest Products Economy, Scenery and Recreation, Cultural or Historical Resources].

Past Actions

Other past actions in or near the project area are many and fall within such categories as prehistoric human presence involving root digging, hunting, and burning; historic human presence of the late 1800s and early 1900s involving road building, settler migrations, military operations, livestock grazing, construction of early Forest Service facilities, and fire suppression; and modern-era management involving timber production and timber stand improvement, wildland fuel management and fire suppression, livestock grazing, dispersed recreation, firewood cutting, big-game management, and road and facilities construction and maintenance. These past actions influenced forest composition, structure and growth, and the management infrastructure of the area. Thus, some of these actions are still reflected, with individual variance, in the current condition of the area's natural resources and human environmental values.

The current, aggregate effects of certain past actions were determined to be relevant to considerations of possible cumulative impacts of the proposed action. These *other past actions* and their relevance are as follows:

- Managed livestock grazing of the modern era in the Spring Creek and Flag Prairie grazing allotments.

  [Forest Fire Hazards, Soil and Water, Forest Vegetation, Wildlife, Fisheries and Amphibians, Sensitive Plants, Cultural or Historical Resources]

- Wildfires occurring since 1990 in the Crane Creek subwatershed, including the 1990 Sheep Mountain Fire that burned 4,781 acres within the subwatershed and 6,101 acres outside the subwatershed, and two other 1990 fires that burned 84 and 53 acres, respectively, within the subwatershed (see also map "16_rd_fire_history_040705.pdf" in project record).

  [Forest Fire Hazards, Soil and Water, Snags and Woody Debris, Forest Vegetation, Wildlife, Fisheries and Amphibians, Noxious Weeds, Sensitive Plants, Livestock Grazing]

- Other wildfires occurring since 1989 within the Glacier Lynx Analysis Unit (Glacier LAU—37,523 acres lying adjacent to and directly north of the project area involving 80 acres in common). These other fires include several small fires that burned less than 1000 acres each. The 1990 Snowshoe Fire burned 2,964 acres and the 1990 Sheep Mountain Fire burned 5,174 acres in the Glacier LAU. The 2002 High Roberts Fire burned 8,855 acres and the 2002 Monument Fire burned 1,890 acres in the Glacier LAU.

  [Lynx]

- General timber-harvest projects and associated road construction since the early 1970s in the Crane Creek subwatershed as shown in the following table. Records show that about 72 percent of the forested area within the subwatershed has received some kind of a silvicultural treatment, with some areas being treated more than once. Within the last 20 years, about 9,802 acres (25 percent) of the forested area has been treated; almost no activity has occurred, however, within the last ten years.

Table 20. Crane Creek subwatershed timber harvest acres by year

Harvest Year	Acres	Harvest Year	Acres
1973	4,150	1986	2,818
1977	8	1987	652
1978	2,990	1988	1,016
1979	244	1989	332
1980	4,822	1990	503
1981	53	1991	1,086
1982	3,382	1992	1,982
1983	757	1993	1,030
1984	602	1994	8
1985	1,247	1995	375
		Total	28,056

Of these harvest treatments, those classified as HCC, HCP, HCR, and HSH in the table below are reproduction harvest treatments in which the stands were converted to an early stage of forest succession. Most of these treatments are concentrated in the northern portion of the subwatershed and were associated with the 1990 Sheep Fire. The HSV, HFR, HOR, and HPR treatments removed larger overstory trees and changed stands toward younger and more even-aged conditions.

Table 21. Crane Creek subwatershed timber harvest acres by treatment type

Harvest Treatment	Harvest Treatment Code	Acres
Clearcut	HCC	807
Clearcut Protect Advanced Regeneration	HCP	343
Clearcut With Seedtrees Reserved	HCR	4,102
Final Removal Cut	HFR	4,934
Overstory Removal	HOR	1,957
Partial Overstory Removal	HPR	8097
Sanitation	HSA	21
Shelterwood	HSH	1,211
Select Tree Removal	HSL	101
Salvage	HSV	6,390
Commercial Thin	HTH	15

[Forest Fire Hazards, Soil and Water, Snags and Woody Debris, Forest Vegetation, Wildlife, Fisheries and Amphibians, Noxious Weeds, Livestock Grazing, Scenery and Recreation, Cultural or Historical Resources]

- Particular timber-harvest projects of the past twenty years involving various cutting methods and occurring within three miles of the project boundary, as follows: Barrel (7.7 acres), Bearmilk (1,745 acres), Bullet (1,814 acres), Phoenix (1,840 acres), Roaring (389 acres), Silver (620 acres), and Wickiup (18 acres).

[Sensitive Plants]

- Particular timber-harvest projects since 1990 involving various cutting methods and occurring within the Spring Creek or Flag Prairie grazing allotments, as shown in the following table.

Table 22. Acres Harvested (using various methods) in Spring Creek and Flag Prairie Allotments 1990-present (based on GIS harvest layer)

Project Name	Year	Allotment	Acres Harvested
Roaring	90-91	Spring Creek	296
Bullet	91-93	Spring Creek	1520
Silver	92-93	Spring Creek	1441
Phoenix	93-95	Spring Creek	571
Wickiup	94	Spring Creek	3
Barrel	95	Spring Creek	4
Total Acres			3,835

[Livestock Grazing]

- Broadcast burning from 1986 to 1995 in the Crane Creek subwatershed. About 166 acres of burning was accomplished in reproduction harvest units for fuels reduction and site-preparation for natural or artificial regeneration. None of this burning was within the current project area.

  [Forest Fire Hazards, Soil and Water, Forest Vegetation, Wildlife, Fisheries and Amphibians, Noxious Weeds, Livestock Grazing]

- Precommercial (noncommercial) thinning since the mid-1960s in the Crane Creek subwatershed as shown in the following table. Records show that such thinning often occurred among retained lower-level trees following commercial harvest of an area.

Table 23. Crane Creek subwatershed precommercial thinning acreage by year

Treatment Year	Acres	Treatment Year	Acres
1965	88	1983	149
1966	58	1984	39
1968	50	1985	302
1972	374	1986	830
1973	523	1987	394
1974	61	1988	620
1975	859	1989	85
1976	492	1990	481
1977	697	1991	72
1979	18	1992	29

Treatment Year	Acres	Treatment Year	Acres
1980	214	1994	530
1981	159	1996	6
1982	137	**Total**	7,267

[Forest Fire Hazards, Snags and Woody Debris, Forest Vegetation, Wildlife, Livestock Grazing, Scenery and Recreation]

- All timber sales on all land ownerships in Grant and Harney counties during the past five years.

  [Forest Products Economy]

Present Actions

The current, aggregate effects of certain present actions were determined to be relevant to considerations of possible cumulative impacts of the proposed action. These *other present actions* and their relevance are as follows:

- High Roberts Fire Salvage—Commercial harvest to salvage 2.7 million board feet in dead and dying trees burned by the 2002 High Roberts Fire, on 209 acres 8-10 miles northwest of the project area, in the Upper Big Creek and Lake Creek subwatersheds, T.15S., R.34E., Sections 27 and 28.

  [Lynx]

- Monument Fire Recovery Project—Commercial harvest to salvage 26.5 million board feet in dead and dying trees burned by the 2002 Monument Fire, on approximately 4,900 acres of national forest or private land 5-10 miles northeast of the project area, in the Upper North Fork Malheur River and Little Malheur River watersheds.

  [Lynx]

- North Fork Malheur River Prescribed Fuels Reduction Project—Noncommercial hazardous fuel-reduction treatments, including thinning and underburning, on a total of approximately 4,000 acres 3-10 miles east of the project area, in the North Fork Malheur River watershed, T.16S., R.35E., sections 12, 13, 24, and 25; T.16S., R36E., sections 7, 8, 16-21, and 28-30.

  [Sensitive Plants]

Reasonably Foreseeable Future Actions

The current, aggregate effects of certain reasonably foreseeable future actions were determined to be relevant to considerations of possible cumulative impacts of the proposed action. These *other reasonably foreseeable future actions* and their relevance are as follows:

- Ongoing permitted grazing in the Crane Creek subwatershed under current allotment management plans.

  [Forest Fire Hazards, Soil and Water, Forest Vegetation, Wildlife, Fisheries and Amphibians, Sensitive Plants, Cultural or Historical Resources]

- A Crane Prairie Administrative Fuels Reduction project is listed on the 2005 Schedule of Proposed Actions. This project would involve several acres of fuels reduction within the Crane Prairie Guard Station administrative site.

  [Forest Fire Hazards, Soil and Water, Forest Vegetation, Wildlife, Fisheries and Amphibians, Noxious Weeds, Sensitive Plants, Cultural or Historical Resources]

- Other planned forest underburning that could occur during the same season as underburning of the proposed action, particularly the Crooked Creek project approximately 10 miles to the west or the Pine Creek WUI project approximately 18 miles to the northwest.

  [Air Quality]

- Ongoing road closures and road decommissioning associated with the 1990s Phoenix project would continue to be completed in the Crane Creek subwatershed over the next five years (see also the following related documents in the project record: "Copy (2) of road list.doc"; "16_rd_phoenix_rd_status_032905_final.pdf"; and "Pheonix_Access_Plan.xls").

  [Soil and Water, Snags and Woody Debris, Wildlife, Fisheries and Amphibians, Noxious Weeds, Scenery and Recreation, Cultural or Historical Resources]

- Planned thinning and prescribed burning projects of the next decade involving approximately 14,038 acres in the Flag Prairie grazing allotment and 7,136 acres in the Spring Creek grazing allotment.

  [Livestock Grazing]

- All timber sales on all land ownerships in Grant and Harney counties during the next five years.

  [Forest Products Economy]

- Four future forest-health projects in the Crane Creek subwatershed are listed on the Malheur National Forest 5-Year Action Plan, all of which would occur along Forest Road 16. Currently, none of these projects are designed or proposed. It is expected, however, that these actions would involve purposes and treatments similar to those of the proposed action, including hazardous fuel reduction through thinning or burning, providing firefighters a defensible corridor along Forest Road 16, and changing current forest conditions to reflect less departure from historic conditions. These combined projects represent a possible additional treatment area of approximately 10,000 acres. They include the following:
  - Buttermilk project—thinning and prescribed burning—approximately 2,300 acres
  - Elk 16 project—thinning and prescribed burning—approximately 60 acres
  - Little Wet Bear project—thinning and prescribed burning—approximately 3900 acres
  - Upper Crane project—thinning and prescribed burning—approximately 3,600 acres

  [Forest Fire Hazards, Forest Vegetation, Sensitive Plants, Livestock Grazing, Scenery and Recreation]