# Decision Notice

Finding of No Significant Impact

& Finding of Non-significant Amendment

# Sunflower Bacon Project

**USDA Forest Service**
**Heppner Ranger District, Umatilla National Forest**
**Morrow and Grant Counties, Oregon**
T 6 S, R 26 E; T 6 S, R 27 E; T 7 S, R 26 E; and T 7 S, R 27 E; Willamette Meridian

## Decision and Reasons for the Decision

### Background

This decision notice documents my decision and rationale for selecting a course of action to be implemented for the Sunflower Bacon Project. This project area is located in the central portion of the Heppner Ranger District about 20 air miles south of the town of Heppner, Oregon and is in the Alder/Upper Skookum subwatershed of the North Fork John Day River Subbasin.

In 1995, the Umatilla National Forest completed the Wall Ecosystem Analysis (watershed analysis). The watershed analysis compares existing resource conditions with the desired future conditions and provides recommendations for treatments to meet desired conditions. The Sunflower Bacon project falls within the central portion of this watershed analysis area.

The watershed analysis identified the Sunflower Bacon project area as a high concern for vegetation sustainability and identified a need for action to improve sustainability. Specifically, portions of the subwatershed were identified as high priority for treatment to move forest structural classes and species composition toward historical ranges. The watershed analysis also identified large acreages of juniper encroachment into ponderosa pine stands where treatment was recommended (watershed analysis, p. 84 to 86). A majority of the subwatershed was identified as moderate priority for fuel treatment and/or reintroduction of fire (watershed analysis, p. 70). As identified in the watershed analysis and in the Sunflower Bacon environmental assessment and associated analysis file, the forested areas in the project area are currently outside the historical range based on their stand densities, structural diversity, species composition and the fire regime condition class.

The purpose of the Sunflower Bacon project is to improve the health and vigor of dry and moist upland forests and reduce the potential for future fires of uncharacteristic effects in these areas.

There is a need to:

- increase the amount of old forest with a predominance of large trees in a single strata
- shift dry upland forests to a more historic species composition
- reduce stand densities
- modify current vegetative stand structures to maintain or move the landscape towards a Fire Regime Condition Class 1

The environmental assessment (EA) documents the analysis of 3 alternatives to address these needs.

## Decision

Based upon my review of all alternatives, I have decided to implement Alternative 4 – modified (Selected Alternative). Modifications will occur in the harvest method of unit 74. Unit 74 will be harvested using a forwarder harvesting system rather than a skidder harvesting system. This modification will reduce the need for 0.8 miles of temporary road and eliminate the crossing of a class 4 stream. The total area receiving treatment would be 2,761 acres of commercial and noncommercial thinning and 7,563 acres of landscape burning only for a total of 10,324 acres treated. The specific actions to occur in my decision include:

- Commercial thin 1,581 acres (includes 40 acres of salvage in portions of Units 56 and 57) and variable density retention thin 476 acres; thinning a total of 2,057 acres and producing an estimated volume of 12,719 hundred cubic feet (Ccf). Whole-tree timber harvest using skidders would occur on 1,358 acres and ground-based systems using harvesters and forwarders would occur on 699 acres.
- Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 3.0 miles of temporary roads will be used and obliterated, 33 miles of open road maintained, and 8 miles of open road reconstructed.
- Activity fuel reduction on 273 acres would be treated either mechanically or by prescribed fire and 1,784 acres would be treated as part of the 9,347 total acres of landscape burning.
- Landscape burning would occur on 9,347 acres. Burn control lines would be constructed using mechanical equipment along 6 miles of the outer boundary of the thinning units and using hand or wet line along 5.7 miles of the boundary of individual burn blocks.
- Noncommercial thinning would occur on approximately 1,485 acres; 704 acres outside commercial thin units and 781 acres within commercial thin units.
- Closing of FS Road 2120-070 (1.1 miles).

The project design elements that were developed reflect existing direction found in the Umatilla National Forest Land and Resource Management Plan and program direction established on the Forest. The specific project design elements associated with the Sunflower Bacon Project that will be implemented are listed on pages 2-16 to 2-18 of the EA.

Activities and their effects, including the implementation of project design elements, will be monitored by the Forest Service as described on pages 2-18 thru 2-19 of the EA.

## Reason For Decision

I have reviewed the Sunflower Bacon EA, the information in the analysis file, the Forest Plan, the Wall Ecosystem Analysis, public comments, and applicable laws and regulation. I have determined that there is adequate information to make a reasoned choice among the alternatives.

In making the decision, I considered how each alternative addresses the stated purpose and need and complies with applicable, laws regulations, and policies. I have also considered the public and agency comments submitted in response to the 30 day comment period.

**Response to Purpose and Need**

I find that all of the action alternatives (Alternatives 2, 3 and 4) address the project objectives but to different extents with different effects and tradeoffs. I considered the potential outcome to this area if I had selected no action. I concluded that by acting now and reducing fuel levels, thinning stands, and altering structure and species composition; future stand conditions and habitat conditions within the Sunflower Bacon area would improve compared to the potential consequences of a large, uncharacteristic wildland fire or insect outbreak. Either of these events could significantly reduce the big game winter range habitat, other wildlife habitat and all other benefits of a healthy and intact forested environment as compared to the Selected Alternative. I find that Alternative 1, the no action alternative, fell well short of addressing the purpose and need for action and it would be an irresponsible course of action to do nothing.

I find that Alternative 4-modified provides for the most balanced approach to addressing the purpose and need for action goals, while responding to the major issues. Although the Selected Alternative does not address the vegetation and fuel related purpose and need objectives to the same extent as Alternative 2, I believe it makes significant progress in moving the area toward a more historic species composition. Alternative 4-modified increases the ponderosa pine and mixed ponderosa pine dominated stands by 679 acres, increases mixed Douglas-fir stands by 268 acres and reduces mixed grand fir and Douglas-fir dominated stands by 947 acres. Although ponderosa pine and Douglas-fir forest types are still outside the historic range of variability, the Selected Alternative will increase dry forest ponderosa pine and decrease Douglas-fir in the subwatershed bringing the area closer to the historic range of variability.

The Selected Alternative will also shift 1,022 acres of stand structure from stem exclusion closed canopy to stem exclusion open canopy and shift 127 acres of old forest multi strata to old forest single strata in the Sunflower Bacon project area. This shift in structure will meet the need to increase the current and future stands of old forest with a predominance of large trees in a single stratum. Based on the analysis from Forest Vegetation Simulator growth and yield model the desired outcome of old forest structure will be reached in 10 to 60 years on stands being treated with this one thinning and underburning. I find this to be very important in moving the area closer to the historic range of variability for forest structure.

The Selected Alternative will reduce stand densities on 2,659 acres of upland forest to recommended stocking levels based on plant association. I feel it is important to increase stand health and vigor by reducing stand density resulting in an increase of light, minerals, and water to individual trees.

Through thinning of vegetation and underburning the fire regime condition class will be improved and maintained on both an individual stand and landscape level. Following project implementation, condition class 2 and 3 will be moved to condition class 1 on 2,314 acres. I believe that thinning, coupled with 9,347 acres of landscape burning, will improve and maintain the fire regime condition class on 58 percent of the Sunflower Bacon landscape and will decrease any effects to key ecosystem components on the landscape should a wildfire occur. The project will also reduce the possibility that a large scale wildfire would develop. I feel it would be irresponsible not to act now considering the vegetative conditions within the upland forest in the

Sunflower Bacon area where existing conditions are expected to support a high intensity fire resulting in the loss of key ecosystem components, including big game habitat.

**Response to Issues**

In making the decision to select Alternative 4-modified I also considered its response to the major issues. Compared to the other alternatives this decision will retain all satisfactory big game cover in the C3 management area, a desired habitat in the winter range, while still treating marginal cover with a variable density thinning prescription. Variable density thinning will provide patches of hiding cover to aid in reducing big game vulnerability. I feel that by treating marginal cover the result will provide for a more resilient habitat for big game in the short and long-term while reducing the impacts of stands that have developed into conditions that are not sustainable in the long-term.

The Selected Alternative maintains all existing satisfactory cover in the Monument winter range. Satisfactory cover and total cover in the winter range would continue to meet Forest Plan standards (10 % satisfactory and 30% total cover) following treatment under this alternative. By meeting Forest Plan standards for cover in the C3 management area, this alternative would maintain a high level of quality cover and maintain a habitat effectiveness index near the Forest Plan standard.

The habitat effectiveness index (HEI) model uses the amount and spatial distribution of satisfactory cover, marginal cover, forage, and the open road network in the winter range to assess cumulative impacts to elk habitat within the entire winter range area. HEI is currently 69 in the Monument Winter Range and would remain 69 after treatment under Alternative 4-modified. Although an HEI value of 69 is indicative of; good cover to forage ratio in the winter range, good spatial distribution of cover and forage habitats, and low road densities; it does not meet the Forest Plan standard of 70.

As part of my decision, the Selected Alternative amends the Forest Plan to change the habitat effectiveness index (HEI) from 70 to 69 for the Monument Winter Range for the duration of this project. The HEI for the Monument Winter Range is currently (before treatment) 69, which is below the "desirable" index described in the Forest Plan. Even after the implementation of the Selected Alternative, the Monument Winter Range would still maintain an HEI of 69. I carefully read through the analysis of this Forest Plan amendment in the specialists' reports for Sunflower Bacon and discussed its effect to wildlife habitat before coming to my decision. I also weighed the potential outcome to this area if I had selected the No-Action Alternative. I concluded that by acting now and reducing stand densities and altering stand structure and species composition, that future stand conditions and thus cover and forage conditions within the Sunflower Bacon area would improve as compared to the consequences of a wildland fire or insect outbreak. Such an event could significantly reduce the HEI for the area as compared to the Selected Alternative.

The Selected Alternative will address elk vulnerability by closing approximately 1.1 miles of seasonally open road. Units 17 and 92, in the eastern portion of the analysis area would be left untreated to maintain cover habitat quality in large patch sizes for big game animals. The Selected Alternative will allow silvicultural treatment of overstocked stands while creating a mosaic of open forage areas and dense patches of cover across the landscape. The patchiness of these stands will minimize increased vulnerability by reducing sight distances in treated stands, and breaking up the outline of elk. Forage would be interspersed with cover patches, creating foraging habitat for elk.

The biggest difference between action alternatives is the thinning treatment within the C3 Big Game Winter Range management area. Alternative 2 thins 390 more acres of overstocked stands, converts 226 more acres of stem exclusion closed canopy to open canopy, and shifts the dominate species composition toward ponderosa pine and mixed ponderosa pine on 118 more acres than Alternative 4-modified. The result of these differences on big game habitat is that under Alternative 2 satisfactory cover within the C3 management area would be reduced to the forest plan minimum standard of 10 percent. Alternative 4-modified retains all existing satisfactory cover within the C3 management area.

Alternative 3 focuses on maintaining existing cover within the C3 management area but it does not treat as many acres to address the purpose and need as the Selected Alternative. Alternative 3 thins 476 less acres of overstocked stands, converts 299 less acres of stem exclusion closed canopy to open canopy, and shifts the dominate species composition toward ponderosa pine and mixed ponderosa pine on 120 less acres than Alternative 4. The results of these differences on big game habitat is that under Alternative 3 marginal cover in the C3 management area would not be treated and in the long term the risk of losing big game habitat is high should a large-scale wildfire or insect outbreak occur.

The Selected Alternative is not the alternative that best meets the purpose and need nor is it the alternative that would have the least potential affect to big game. I selected this alternative because it treats much of the area identified where vegetative treatment will be effective at altering stand density, composition and structure while still providing important winter habitat and reducing impacts on big game and their habitat.

**Response to Comments and Resources**

In addition to how the Selected Alternative met the purpose and need and addressed the major issues, I considered how the alternatives respond to resources and comments received during the scoping and the 30 day comment period.

Comments received questioned whether an upper size limit (8” to 10” dbh) can be placed on the trees removed from the thinned areas. I feel that the prescriptions and proposed activities can not place upper limits on tree diameters to be thinned without losing the ability to address the purpose and need objectives of reducing stand densities to healthy levels or altering stand structure and species composition toward historical ranges.

Comments received included concerns of how fire hazard and behavior would change after the project was implemented. Specific concerns included an increase in fire hazard by opening stands and altering microclimates to dry surface fuels and increase wind speeds at ground level. I considered these effects and believe that by removing ladder fuels and reducing canopy densities the increase in fire hazard and/or fire behavior would be offset by reducing fire severity should a wildfire occur. Historically it is believed that this is the role fire played in the dry upland forests in the Sunflower Bacon project area and throughout the Blue Mountains.

Other comments expressed concern that harvest activities and associated road work would affect water quality and fish habitat. The protection of water quality and fish habitat during timber harvest operations is always a concern in the development of a project and in my decision. My decision incorporates project design elements (EA p. 2-16 thru 2-18) and best management practices (EA, Appendix A) for water quality to specifically address this concern. In addition my decision of modifying Alternative 4 changes the harvest system on unit 74 eliminating the need for 0.8 miles of temporary road and the associated crossing of a class 4 stream. Although this is not the most economically efficient method to thin this stand I feel that this is an efficient way to receive the benefits of thinning while considering the possible effects to water quality and fish habitat. By eliminating this temporary road and associated crossing, the thinning treatment of the Selected Alternative has the same expected effect to fish and fish habitat as Alternative 3.

On April 6, 2006 a field visit was made with members of the Sunflower Bacon interdisciplinary team and representatives from National Marine Fisheries Service to discuss effects of prescribed fire and riparian habitat conservation areas and streams. On May 9, 2006 the National Marine Fisheries Service (NMFS) issued a letter of concurrence pursuant to section 7 (a)(2) of the Endangered Species Act concluding the actions of the Sunflower Bacon project are, not likely to adversely affect Middle Columbia steelhead and its designated critical habitat and pursuant to section 305(b) of the Magnuson-Steven Fishery Conservation and Management Act concludes that the action, is not likely to adversely affect essential fish habitat designated for Chinook salmon.

Another comment received during the 30 day comment period focused on areas without roads. The effects to undeveloped land determined that areas without roads are small and irregular in shape and isolation is limited to no more than one-half mile from a system road. No special features were identified within the project area. The effects to water, air, soil, plant and animal diversity, habitat, and listed species would be limited because all areas would remain fully stocked after treatment. The recreation opportunity would not change and would remain roaded natural and roaded modified as identified in the Forest Plan. The impacts of this project will not exclude this area or any other areas from consideration for wilderness potential during Forest Plan revision because all areas have received harvest activities in the past, all areas will remain fully stocked after thinning and burning, and no new system roads will be developed.

Some of the comments I received expressed a concern that ground-based logging disturbs and compacts the soil. Forest plan standards, project layout and project design elements are developed for areas of concern (EA, p. 2-16 thru 2-17); these include designation, timing, and methods of equipment operation. Additionally, monitoring will determine if operations need to be altered to meet objectives. The short and long term effects to soil resource are expected to be negligible and fully consistent with the Forest Plan.

Some of the comments I received expressed a concern that increased road density and road use would lead to detrimental environmental effects. Overall road density will be reduced after project implementation. The intent of closing forest road 2120-070 is to reduce big game vulnerability in an area that was of concern to the Oregon Department of Fish and Wildlife.

The intent of eliminating the proposed temporary road associated with unit 74 is to eliminate possible effects to water quality. Under the Selected Alternative all temporary roads would be located outside of RHCA and either in areas where old road templates exist or where vegetation is currently minimal. Temporary roads are located only in areas where rehabilitation and closures will be effective based on soil type and topography. Old road templates used as temporary roads will be rehabilitated to a condition beyond the current state. I base this on experience from recent projects in the area and changes from past operating procedures.

Other roads used during project implementation would have little effect on water and soil resources due to project design elements (EA pages 2-16 to 2-18) and best management practices for water quality (EA, Appendix A).

Other comments received indicated concerns over habitat changes for many species dependant on snags. Any felling of snags would be incidental to green tree harvest (restricted to danger trees and 40 acres identified as salvage harvest). The Selected Alternative is assumed to have less impact on snags than Alternative 2 and a greater impact on snags than Alternative 3 based only on the number of acres treated. At the watershed scale, no overall change would be expected in snag densities in the dry upland or moist upland potential vegetation groups under the Selected Alternative. In the short-term, habitat for primary cavity excavators is expected to be reduced slightly due to hazard tree felling within treatment units and along roads used for haul; conversely, burning could recruit snags through direct mortality. Further snag recruitment will occur within the mosaic of open and high density forest patches created through variable density thinning. Patches of dense forest will allow for locally high populations of insects and disease, which will encourage snag recruitment. These patches will provide sources of clumped snags that will provide nesting and foraging habitat for a number of primary cavity excavator species. Forest Plan standards for snag densities are currently being met within the analysis area, and will continue to be met throughout project implementation and following treatment activities of thinning and burning.

In consideration of how well the alternatives respond to the purpose and need, issues, and concerns; I have concluded that Alternative 4-modified provides the most balanced approach for management within the Sunflower Bacon project area at this time.

## Public Involvement

A proposal to commercially thin dry site stands to reduce tree competition and improve stand health and vigor and non-commercially thin young conifer stands to reduce stocking in the understory has been listed in the Schedule of Proposed Actions since October 2004. The proposal was provided to the public and other agencies for comment during scoping on March 13, 2005. In addition, as part of the public involvement process, upon the request of the Oregon Department of Fish and Wildlife the agencies visited the project area to discuss issues and project development. These scoping efforts resulted in responses from two organizations and one state agency. Documentation of the scoping process may be viewed in the project record, on file at the Heppner Ranger District.

Using the comments from the public, other agencies, and organizations, the interdisciplinary team identified several issues regarding the effects of the proposed action. Main issues of concern included amending the Forest Plan habitat effectiveness index standard in order to treat vegetation within the Monument Winter Range and the effects on quantity and quality of cover habitat that may result in increased vulnerability for big game (elk) during the hunting seasons

(EA, pages 1-13). To address these concerns, the Forest Service created the alternatives described below.

## Alternatives Considered

In addition to the Selected Alternative (Alternative 4-modified), I considered four alternatives in detail and five alternatives were considered and dropped from detailed study for various reasons (EA, pages 2-1 through 2-15). The three action alternatives considered in the EA examine varying combinations and degrees of vegetative treatments and were developed to address the major issues and the purpose and need. For additional details on these alternatives, see the EA (Chapter 2, Alternatives 2 through 4).

### Alternatives Considered in Detail

#### Alternative 1

No Action

Under the No Action Alternative, current management plans would continue to guide management of the project area.

#### Alternative 2

- Commercial thin 2,456 acres (includes 40 acres of salvage in portions of Units 56 and 57) producing an estimated volume of 14,890 hundred cubic feet (Ccf). Whole-tree timber harvest using skidders would occur on 1,747 acres and ground-based systems using harvesters and forwarders would occur on 709 acres.
- Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 4.0 miles of temporary road used and obliterated, 33 miles of open road maintained, and 8 miles of open road reconstructed.
- Activity fuel reduction on 234 acres would be treated either mechanically or by prescribed fire and 2,222 acres would be treated as part of the 10,196 total acres of landscape burning.
- Landscape burning would occur on 10,196 acres. Burn control lines would be constructed using mechanical equipment along 5.5 miles of the outer boundary of the thinning units and using hand or wet line along 4.4 miles of the boundary of individual burn blocks.
- Noncommercial thinning would occur on approximately 1,646 acres; 704 acres outside commercial thin units and 942 acres within commercial thin units.
- The total area receiving treatment would be 3,160 acres of commercial and noncommercial thinning and 7,974 acres of landscape burning only for a total of 11,134 acres treated.

#### Alternative 3

- Commercial thin 1,604 acres (includes 40 acres of salvage in portions of Units 56 and 57) and producing an estimated volume of 9,488 hundred cubic feet (Ccf). Whole-tree timber harvest using skidders would occur on 1,013 acres and ground-based systems using harvesters and forwarders would occur on 591 acres.

- Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 2.4 miles of temporary road used and obliterated, 32 miles of open road maintained, and 8 miles of open road reconstructed.
- Activity fuel reduction on 243 acres would be treated either mechanically or by prescribed fire and 1,361 acres would be treated as part of the 8,617 total acres of landscape burning.
- Landscape burning would occur on 8,617 acres. Burn control lines would be constructed using mechanical equipment along 7 miles of the outer boundary of the thinning units and using hand or wet line along 6.5 miles of the boundary of individual burn blocks.
- Noncommercial thinning would occur on approximately 1,362 acres; 681 acres outside commercial thin units and 681 acres within commercial thin units.
- Close FS Road 2120-070 (1.1 miles).
- The total area receiving treatment would be 2,285 acres of commercial and noncommercial thinning and 7,256 acres of landscape burning only for a total of 9,541 acres treated.

Alternative 4

- Commercial thin 1,581 acres (includes 40 acres of salvage in portions of Units 56 and 57) and variable density retention thin 476 acres; thinning a total of 2,057 acres and producing an estimated volume of 12,719 hundred cubic feet (Ccf). Whole-tree timber harvest using skidders would occur on 1,410 acres and ground-based systems using harvesters and forwarders would occur on 647 acres.
- Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 3.8 miles of temporary road used and obliterated, 33 miles of open road maintained, and 8 miles of open road reconstructed.
- Activity fuel reduction on 273 acres would be treated either mechanically or by prescribed fire and 1,784 acres would be treated as part of the 9,347 total acres of landscape burning.
- Landscape burning would occur on 9,347 acres. Burn control lines would be constructed using mechanical equipment along 6 miles of the outer boundary of the thinning units and using hand or wet line along 5.7 miles of the boundary of individual burn blocks.
- Noncommercial thinning would occur on approximately 1,485 acres; 704 acres outside commercial thin units and 781 acres within commercial thin units.
- Close FS Road 2120-070 (1.1 miles).
- The total area receiving treatment would be 2,761 acres of commercial and noncommercial thinning and 7,563 acres of landscape burning only for a total of 10,324 acres treated.

## Alternatives Considered but eliminated from Detailed Study

Five alternatives were considered and dropped from detailed study for various reasons. Details may be found in the EA on pages 2-13 through 2-15). These five alternatives are:

Diameter Breast Height Size Limitation

No New or Temporary Roads

Use of Fire as a Thinning Tool

No Treatment within the C3 – Big Game Winter Range

Increase Habitat Effectiveness Index

## Finding of No Significant Impact

After considering the environmental effects described in the EA, I have determined that these actions will not have a significant effect on the quality of the human environment considering the context and intensity of impacts (40 CFR 1508.27). Thus, an environmental impact statement will not be prepared. This determination is based on the site-specific environmental analysis documented in the Environmental Assessment and supporting documents which describe direct, indirect, and cumulative impacts of this decision. I have found that the context of the environmental impacts of this decision is limited to the local area and is not significant. I have also determined the severity of these impacts is not significant.

**Context**

The actions included in the Selected Alternative are described in Chapter 2 of the EA. The disclosure of effects may differ by the resource and by the scale of analysis. Therefore, multiple scales and levels of analysis were used to determine the significance of the actions' effects on the human environment. The overall project area for the Sunflower Bacon project area included about 19,798 acres. The Selected Alternative included vegetation modification activities on 2,761 acres, about 14 percent of the project area and fuel treatments on an additional 7,563 acres, about 38 percent of the project area. Activities were designed to improve ecosystem function and resilience to natural disturbance by moving stocking levels, species composition, forest structure, and fuel loads toward their historic ranges. Water qualities and flows would not be measurably impacted. The management activities applied would improve the ability to suppress wildfires and reduce any environmental effects should a wildfire occur. Wildlife and its habitat, soil stability and productivity, and the regional economy would also be affected. The impacts of the Selected Alternative on each of these are disclosed in the EA (Chapter 3). The analyses also found that the activity may affect but not likely to adversely effect Middle Columbia steelhead or its habitat. Therefore, in context, this project is local in scope.

**Intensity**

The environmental effects of the following actions are documented in Chapter 3 of the Environmental Assessment: commercial and noncommercial harvest of trees; reduction of fuels by prescribed fire and mastication, temporary road construction and decommissioning, and temporary use of roads designated closed in the Access and Travel Management Plan. The beneficial and adverse direct, indirect, and cumulative impacts discussed in the EA have been disclosed within the appropriate context, and effects are expected to be low in intensity because of project design including management requirements developed to protect or reduce impacts to resources. Significant effects to the human environment are not expected. The rationale for the determination of significance is based on the environmental assessment. I base my finding on the following:

1. My finding of no significant environmental effects is not biased by the beneficial effects of the action. The interdisciplinary team analyzed and disclosed the direct, indirect and

cumulative effects of the actions on forest vegetation (EA pages 3-2 to 3-17), fire severity and fuels (pages 3-17 to 3-28), wildlife and wildlife habitat (pages 3-28 to 3-99), soils (pages 3-99 to 3-109), water (pages 3-109 to 3-118), fish populations and aquatic habitat (pages 3-118 to 3-144), non-forest vegetation including: range, botanical plants, and noxious weeds ( pages 3-144 to 3-153), recreation (pages 3-153 to 3-155), cultural resources (pages 3-155 to 3-157), air quality (pages 3-157 to 3-159), visual quality (pages 3-159 to 3-163), areas without roads (pages 3-163 to 3-167), and economics (pages 3-168 to 3-171). The direct, indirect, and cumulative effects of the Selected Alternative included the following:

- improved stand health
- short-term and long-term development of single-layer old forest stands
- species composition more representative of historic conditions
- reduced stand density
- improved fire regime condition class based on vegetative component
- decrease in ladder fuel continuity and crown fire potential
- short-term increase in fuel loads
- improved habitat for species dependant on dry forest habitat
- increase in forage habitat
- decrease in hiding cover and dense canopy
- shift of some marginal cover to forage
- compaction and mobilization of soil from mechanized harvest and temporary road construction
- short-term increase in exposed soil
- increased probability of noxious weed establishment and spread
- smoke emissions from prescribed burning

2. There will be no significant effects on public health and safety, because water quality would not measurably change (EA, pages 3-109 to 3-144 and 3-172 to 3-173) and is consistent with the Forest Plan and the Clean Water Act. Prescribed burning would ensure compliance with air quality standards (EA, pages 3-157 to 3-159 and 3-173). Prescribed burning operations would comply with the State of Oregon's Smoke Management Implementation Plan in order to reduce the effects of smoke on public health (EA, pages 3-157 to 3-159 and 3-173). Additional mitigation measures are designed to protect public health and safety by requiring safe road standards and road signing.

3. There will be no significant effects on unique characteristics of the area, because there are no: prime farmland, forestland, rangeland (EA, page 3-179) , wilderness, or wild and scenic rivers (EA, pages 3-171). There would be no effect to floodplains or wetlands (EA, page 3-174) or inventoried roadless areas (EA, page 3-171). There are no parklands or ecologically critical areas that could be affected by this action.

4. The effects on the quality of the human environment are not likely to be highly controversial because there is no known scientific controversy over the impacts of the project. There are differing opinions in the community on the management actions necessary to improve forest health and reduce fire intensity in Blue Mountain forest ecosystems. The level of controversy or interest in what course of action to take

regarding forest management is not the focus of this criterion, rather the degree of scientific controversy over the effects disclosed in the analysis. No significant disagreements have been identified with the disclosure of effects in Chapter 3 of the EA. While some comments differed with my conclusion that the proposed action would affirmatively respond to the purpose and need, the reasons for this difference are based on opinions, not with the disclosure of effects. The Umatilla National Forest Land and Resource Management Plan (Forest Plan) permits thinning, salvage, and prescribed fire in this area, and these activities have historically been conducted in this area. The EA effectively addressed and analyzed all major issues associated with the project. During scoping, 30-day public review of the EA, and effects analysis, no scientific controversy over unacceptable effects was identified.

5. We have considerable experience with the types of activities to be implemented. The effects analysis shows the effects are not uncertain, and do not involve unique or unknown risk (EA, Chapter 3). The best available scientific information provided the foundation for designing the Sunflower Bacon project. Thinning, salvage, road work and prescribed fire have been implemented successfully on the Heppner Ranger District. These past activities have been monitored (Analysis File) and the monitoring results provide a good baseline for predicting future outcomes. Recent monitoring has found that Best Management Practices for the protection of soil and water resources are effective in keeping detrimental impacts to within Forest Plan standards. I am satisfied that the project, as designed, and the effects disclosed in the EA present no highly uncertain or unknown risks.

6. The action is not likely to establish a precedent for future actions with significant effects, because harvest is not a new activity within this analysis area and the proposed prescribed burning of natural and activity fuels has occurred in numerous parts of the Umatilla National Forest. Harvest, thinning, and prescribed burning are allowed in this area by the Forest Plan. The EA effectively addressed and analyzed all major issues associated with the project. While sustaining dry forest stands at or near historic conditions would require increased use of prescribed fire in the future, this would also reduce fuel loads and continuity so that wildfires would have lower risk of catastrophic effects. The Forest Plan amendment applies only to the Sunflower Bacon project, only within the Monument Winter Range, for the duration of the project (EA, page 2-11). Based on this information, implementing the Sunflower Bacon decision will not set precedent for future actions with significant effects.

7. The cumulative impacts are not significant (see EA Chapter 3). The Environmental Assessment discloses the projected cumulative effects of implementing the Sunflower Bacon project. The list of past, present, and reasonably foreseeable future activities in the area that were considered for the cumulative effects analysis for each resource topic is in Appendix F of the EA. I recognize some cumulative effects will occur; however, these cumulative effects are not considered to be significant at the scale and time frame addressed by this analysis and decision. Regarding the Forest Plan amendment in the Monument winter range, the EA analyzed the cumulative effects of the amendment on big game habitat within the winter range (HEI analysis). The Habitat Effectiveness Index calculated under the Sunflower Bacon project is a cumulative measure of elk habitat quality because it incorporates the effects of past managament activities and natural

events in the winter range. HEI in the winter range would not change from the existing value of 69 following treatment. The proposed Forest Plan amendment would only apply to the Monument winter range; there would be no impacts on adjacent winter ranges. The amendment will only apply for that time required to complete this project. Other projects within the Monument winter range also required a Forest Plan amendment maintaning an HEI below forest plan standards. There is no cumulative effect of these amendments because each amendment applies to a specific project for a specific period of time in portions of the winter range that are spatially distinct from one another. The projects that have occurred in the winter range (and their associated amendments) have maintained the existing HEI in the winter range. While there are cumulative effects, I am satisfied that the effects as disclosed in the EA are not significant.

8. The action will have no significant effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, because the project area has been inventoried for such properties and no properties were located within the proposed treatment units (EA, page 3-155 to 3-157). The action will also not cause loss or destruction of significant scientific, cultural, or historical resources, because the project area has been inventoried for these resources and no such properties were located within the proposed treatment units (EA, pages 3-155 to 3-157). Any cultural or historic resources discovered during the project will be avoided. The Forest has complied with Section 106 of the National Historic Preservation Act for the Sunflower Bacon Project EA (EA, pages 3-171).

9. The action will not adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species act of 1973, because there are no unique or isolated populations of wildlife or plants (EA pages 3-51 and 3-144 and Biological Evaluations for aquatic, terrestrial wildlife and botanical species in the analysis file. Road work within riparian areas may affect, [but are] not likely to adversely affect the threatened Middle Columbia Steelhead and its habitat (EA, page 3-144). The National Marine Fisheries Service concurred with this not likely to adversely affect finding in consultation required by Section 7 of the Endangered Species Act (Analysis File). Road work within riparian areas may impact individual interior redband trout or its habitat but would not contribute to a trend towards federal listing or cause a loss of viability to the population or species (EA, page 3-143). Landscape burning may impact individual gray flycatchers or their habitat but would not contribute to a trend towards federal listing or cause a loss of viability to the population or species (EA, page 3-51). Thinning, salvage, fuels treatments, and road work would have no impact on any other threatened, endangered or sensitive species expected to occur on the Umatilla National Forest (EA, pages 3-41 to 3-51, 3-136 to 3-144). The area would continue to provide a diversity of plant and animal communities which meet overall multiple-use objectives. Although use patterns may change due to these activities, sufficient habitat remains to ensure viability of all species in the area (EA, pages 3-28 to 3-99 and 3-118 to 3-144).

10. The action will not violate Federal, State, and local laws or requirements for the protection of the environment. Applicable laws and regulations were considered in the EA (EA, pages 3-171 to 3-179). The action is consistent with the Umatilla National Forest Land and Resource Management Plan (EA, pages 3-175 to 3-178).

## Findings Required by Other Laws and Regulations

This decision to commercially thin 1,581 acres of upland forest (including salvage harvest of 40 acres) variable density thin an additional 476 acres, noncommercial thin an additional 704 acres, and landscape burn a total of 9,347 acres and the connected actions to these activities are consistent with the intent of the Forest Plan's long term goals and objectives listed on pages 4-1 to 4-3 and 4-15 to 4-46. The project was designed in conformance with land and resource management plan standards and incorporates appropriate land and resource management plan guidelines (Land and Resource Management Plan, pages 4-47 to 4-93).

The Forest Service Land Management Planning Handbook (Forest Service Handbook 1909.12) lists four factors to be used when determining whether a proposed change to a Forest Plan is significant or not significant: timing; location and size; goals, objectives and outputs; and management prescriptions.

**Timing:** The timing factor examines at what point over the course of the Forest Plan period the Plan is amended. Both the age of the underlying document and the duration of the amendment are relevant considerations. The handbook indicates that the later in the time period, the less significant the change is likely to be. As noted in the EA the action is limited in time in that it would only apply for the duration of the Sunflower Bacon Project. The Record of Decision for the Umatilla Forest Plan was signed June 11, 1990 and the revision process has begun for the *Land and Resource Management Plan, Umatilla National Forest*.

**Location and Size**: The key to location and size is context, or "the relationship of the affected area to the overall planning area. . . [T]he smaller the area affected, the less likely the change is to be a significant change in the forest plan." The planning area for the Umatilla National Forest is about 1.4 million acres (Forest Plan, page 1-4). The Monument Winter Range, within which the amendment would be effective is 58,600 acres out of 277,677 acres of winter range on the forest (21 percent). The amendment would only apply to the Sunflower Bacon Project within the Monument Winter Range. The Sunflower Bacon Project would classify marginal cover as forage (the amount of marginal cover and spatial distribution being several of the determinants of habitat effectiveness index) on 476 acres of the Monument Winter Range (0.8 percent). It is the effect to cover on these 476 acres that triggers the need for the Forest Plan amendment.

Thus, the size of the area projected to be affected during the project's time period is very small when compared to the total size of the Monument Winter Range.

**Goals, Objectives, and Outputs**: The goals, objectives, and outputs factor involves the determination of "whether the change alters the long-term relationship between the level of goods and services in the overall planning area" (Forest Service Handbook 1909.12, section 5.32(c)). This criterion concerns analysis of the overall Forest Plan and the various multiple-use resources that may be affected. In this criterion, time remaining in the planning period to move toward goals and achieve objectives and outputs are relevant considerations. The anticipated changes brought about by this amendment in the levels of resource activities and outputs projected in the plan (Forest Plan, page 4-16) are expected to be minimal. For example: the project will maintain all satisfactory cover, a high level of potential habitat effectiveness, high quality forage , and the habitat effectiveness index will not change from the existing level for big game within the Monument Winter Range. Implementation of the Sunflower Bacon project will not alter the big game management objectives the Oregon Department of Fish and Wildlife has for this area.

**Management Prescriptions**: The management prescriptions factor involves the determination of (1), "whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning area" and (2), "whether or not the change alters the desired future condition of the land and resources or the anticipated goods and services to be produced" (Forest Service Handbook 1909.12, section 5.32(d)). In this criterion, time remaining in the planning period and changes in desired future conditions or the anticipated goods and services to be produced are relevant considerations.

The proposed change in habitat effectiveness index applies to the Monument Winter Range only for the Sunflower Bacon project (EA, page 2-11). The existing habitat effectiveness index in the Monument Winter Range is 69 and future projects in the Monument Winter Range would also require an amendment if those projects affect habitat effectiveness index. The change in management prescription is only for a specific situation and the effects are short-term and do not affect future decisions throughout the planning area.

The desired future conditions and land allocation as specified in the Forest Plan would not change. As discussed above in “goals, objectives, and outputs”, the long-term levels of goods and services projected in current plans are not measurably changed by the Forest Plan amendment. This information supports the determination that the proposed changes do not constitute a significant amendment of the Forest Plan.

**Finding:** On the basis of the information and analysis contained in the EA and all other information available as summarized above, it is my determination that adoption of the management direction reflected in my decision does not result in a significant amendment to the Forest Plan.

## Implementation Date

If no appeals are filed within the 45-day time period, implementation of the decision may occur on, but not before, 5 business days from the close of the appeal filing period. When appeals are filed, implementation may occur on, but not before, the 15th business day following the date of the last appeal disposition.

## Administrative Review or Appeal Opportunities

This decision is subject to administrative review (appeal) pursuant to 36 CFR Part 215.
The appeal must be filed (regular mail, fax, email, hand-delivery, or express delivery) with the Appeal Deciding Officer: Linda Goodman, Regional Forester, USDA Forest Service, ATTN: Appeals Office, PO Box 3623, Portland, Oregon 97208-3623

The location for hand-delivery: 333 SW 1st Ave, Portland, OR. Send faxes to: 503-808-2255. The office business hours for those submitting hand-delivered appeals are: 7:45 am to 4:30 pm Monday through Friday, excluding holidays. Electronic appeals must be submitted in a format such as an email message, plain text (.txt), rich text format (.rtf), or Word (.doc) to appealspacificnorthwest-regional-office@fs.fed.us. In cases where no identifiable name is attached to an electronic message, a verification of identity will be required. A scanned signature is one way to provide verification.

Appeals, including attachments, must be filed within 45 days from the publication date of the notice of decision in the *East Oregonian*, the newspaper of record. Attachments received after the 45 day appeal period will not be considered. The publication date in the *East Oregonian*, newspaper of record, is the exclusive means for calculating the time to file an appeal. Those wishing to appeal this decision should not rely upon dates or timeframe information provided by any other source.

Individuals or organizations who provided comment or otherwise expressed interest in this project by the close of the comment period specified at 215.6 may appeal this decision. The notice of appeal must meet the appeal content requirements at 36 CFR 215.14.

## Contact

For additional information concerning this decision or the Forest Service appeal process, contact Dave Herr, Environmental Coordinator, Umatilla National Forest, 2517 SW Hailey Ave., Pendleton, OR and (541) 278-3869.

**KEVIN MARTIN** Date
Forest Supervisor
Umatilla National Forest

United States
Department of
Agriculture

# ENVIRONMENTAL ASSESSMENT

Forest Service
Pacific Northwest
Region

# SUNFLOWER BACON

June 2006

Umatilla National Forest
Heppner Ranger District

Grant and Morrow Counties, Oregon


Lead Agency: USDA Forest Service

Responsible Official: Kevin Martin, Forest Supervisor
Umatilla National Forest
2517 SW Hailey Avenue
Pendleton, OR 97801
(541) 278-3716
http://www.fs.fed.us/r6/uma/projects/readroom/

For Information Contact: Janet Plocharsky, Environmental Coordinator
Heppner Ranger District
PO Box 7
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F14-HP-07-06

F14-HP-07-06

# Chapter 1

## Introduction

This environmental assessment (EA) documents the analysis and discloses the potential site-specific effects of the proposed Sunflower Bacon project. This environmental analysis is tiered to and supplements the analysis in the final environmental impact statement prepared for the Umatilla National Forest Land and Resource Management Plan (1990), hereafter referred to as the Forest Plan. The Forest Plan guides management of the Umatilla National Forest.

## Project Area

The Sunflower Bacon project area is located in the central portion of the Heppner Ranger District in Morrow and Grant counties, Oregon, about 20 miles south of the town of Heppner. You can access the project area from Highway 207 at Anson Wright Memorial Park by County Road 670/Forest Road 22 and County Road 847/Forest Road 21. A legal description of the area is T.6S., R.26E., Sections 12-14, 23-26, 35 and 36; T.6S., R.27E., Sections 7, 8, 16-21, 27-34; T.7S., R.26E., Sections 1 and 12; T.7S., R.27E., Sections 1-8, 10-12, 17-20, Willamette Meridian (Figure 1-1).

The project area comprises about 19,798 acres within the National Forest boundary in the Alder/Upper Skookum subwatershed (170702020802) located within the Wall Creek Watershed which drains into the North Fork John Day River. With the exception of the lower end of the Little Wall Creek drainage, the topography is generally a south aspect with 10 to 15% slopes. The elevation ranges between 3200 feet and 4300 feet. Of the 19,798 acres within the Umatilla National Forest boundary 52 acres are private. A portion of the Skookum Roadless Area lies in the southeast corner of the project area. There is no wilderness within the project area.

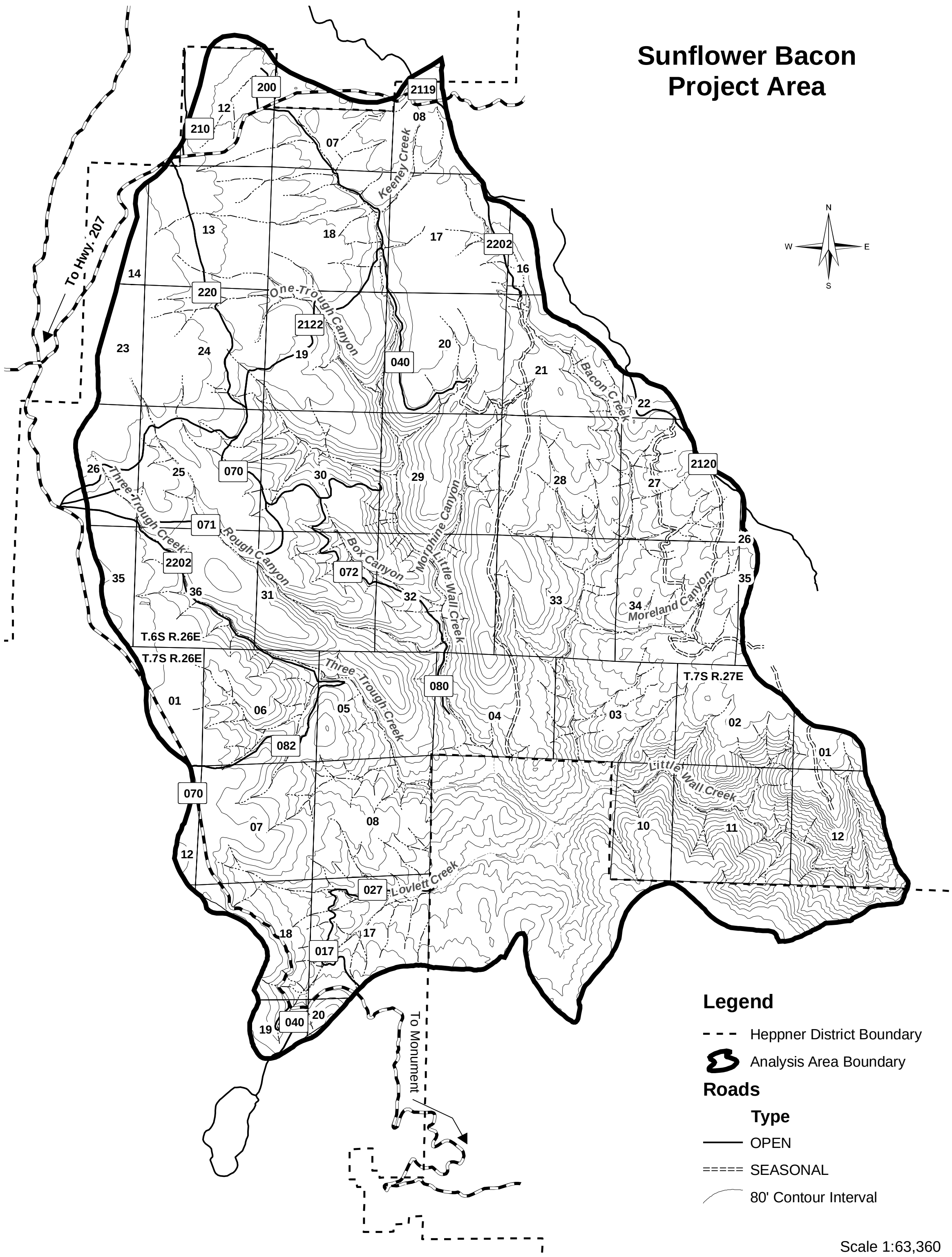


*Figure 1-1: Sunflower Bacon Project Area*

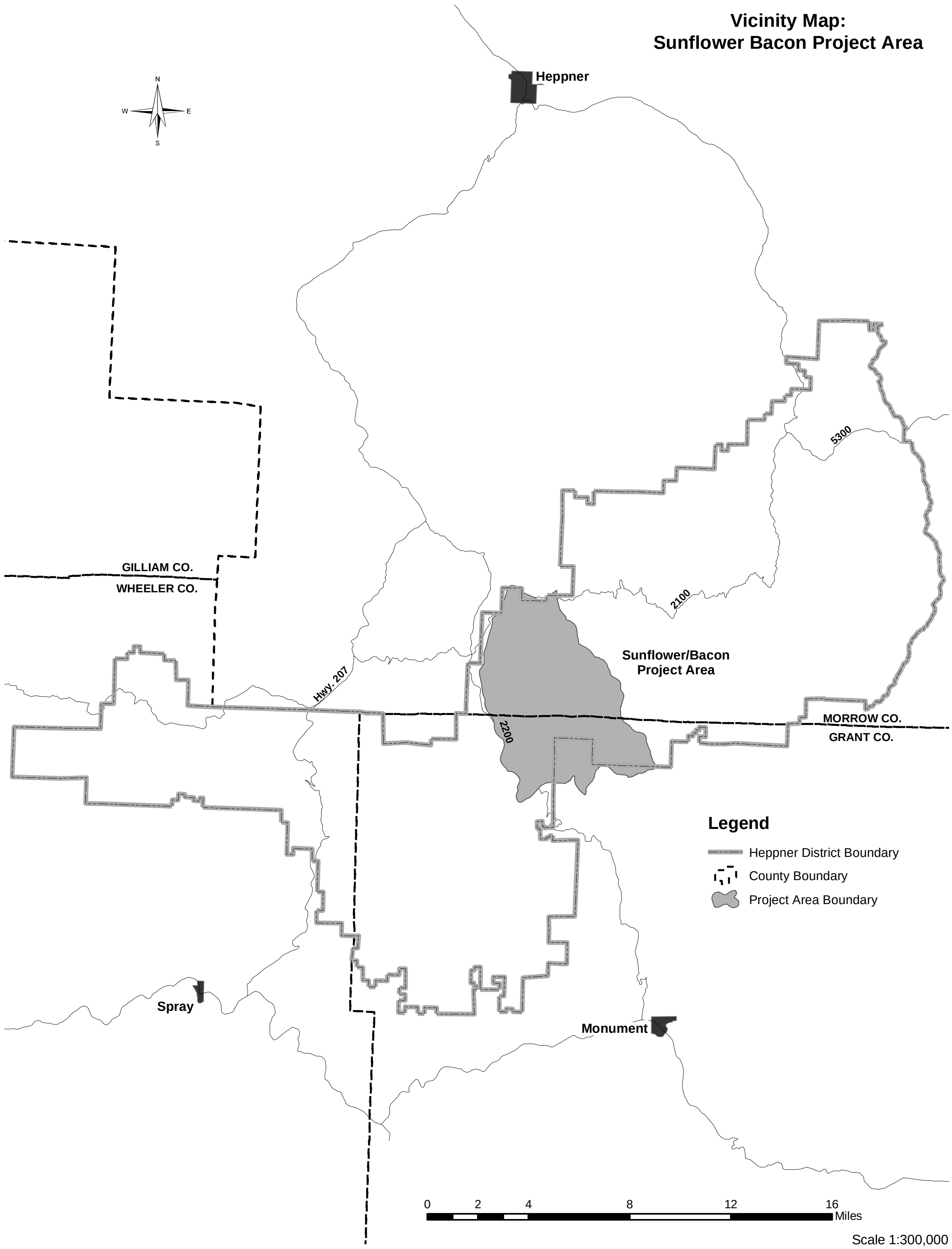


*Figure 1-2: Location of the Sunflower Bacon Project*

# Purpose and Need for Action

The purpose of the Sunflower Bacon project is to improve the health and vigor of dry and moist upland forests, and reduce the potential for future fires of uncharacteristic effects in these potential vegetation groups. These forests are currently outside the Historical Range of Variability (HRV) based on their stand densities, structural diversity, species composition and the fire regime condition class.

In 1995, the Umatilla National Forest completed the Wall Ecosystem Analysis (Watershed Analysis). The Sunflower Bacon project falls within the central portion of the watershed analysis area. The analysis compares existing resource conditions with the desired future conditions. The watershed analysis also provides recommendations for treatments to meet desired conditions.

The Watershed Analysis identified a need for actions in the Sunflower Bacon project area as a high concern for vegetation sustainability and recommenced actions to improve sustainability. Specifically, portions of the subwatershed were recommended as high priorities for treatment to move forest structural classes and species composition toward historical ranges. Large acreages of juniper encroachment into ponderosa pine stands were identified and recommended for treatment (Wall WA p. 84 to 86). Portions of the subwatershed were identified as moderate priority for fire hazard reduction.

## Species Composition

The Sunflower Bacon project area consists of 13,284 acres of dry upland forest sites where the plant association group is ponderosa pine or warm dry grand-fir/Douglas-fir. Douglas-fir has become a dominate species in a once pine dominated ecosystem. This shade tolerant species is now out-of-balance with what would historically occur. Western juniper has also increased in the dry upland forest sites. Juniper has a major impact on the amount of annual precipitation reaching the soil. Juniper can successfully out-compete other vegetation for available soil moisture. (Gedney, et al.1999).

## Forest Structure

Historically, the majority of these dry upland forest sites were characterized by open, park-like conditions. Large, widely spaced ponderosa pines growing above dense undergrowth of tall grasses with scattered pockets of pine regeneration were typical across the landscape. Stand structures in the warm dry plant associations have changed from historic conditions of open, well spaced large trees with sparse regeneration, to current conditions of stands with semi or closed canopies of smaller trees with occasional large trees and abundant regeneration in the understory or multi-layered stands.

An analysis of forest structural classes indicates that several structural classes are outside the historic range of variability. Of particular concern is the low percentage of acres in the old forest-single stratum structural class on dry upland forest sites. Hessburg and others (1999) documented significant declines in old forest-single story[1] forests in the Blue Mountains and throughout the Interior Columbia River Basin. *An assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins* identifies that across all ownerships on dry upland forest sites OFSS has decreased by 15% while OFMS has increased 4% from historical conditions of the 1850 to 1900

[1] Hessburg refers to old forest single story while Powell documentation and the Umatilla National Forest refer to old forest single stratum when classifying structural stages, the two terms are synonymous when describing a forest structural condition

(Quigley et al., 1997). The Wall Ecosystem Analysis found similar declines on dry upland forest sites in the Sunflower Bacon project area and recommended action to move other structural classes toward old forest-single story structure. The stem exclusion-closed canopy and old forest-multi stratum structural stages are currently above their historical ranges (see section 3.2.1.2.1.1.1 for description of structural classes). There is a need to move stands within the stem exclusion-closed canopy and old forest-multi stratum structural classes toward an old forest-single story condition.

## Forest Density

During the last 60 to 90 years, stand density has changed with the suppression of forest fires. Fire exclusion has allowed shade-tolerant fir to grow in underneath the once-open canopies, competing with the ponderosa pine and western larch for light and moisture. Many of the forested stands now contain nearly twice the basal area than what is recommended in the Suggested Stocking Levels for Forest Stands in Northeastern Oregon and Southeastern Washington: An Implementation Guide for the Umatilla National Forest (Powell, 1999). As the forest matures, in the absence of fire, there is an increase in: stand density, competition between trees, stress, and the probability of an uncharacteristic large scale event caused by insects, disease or wildfire.

Forty percent of dry upland forest and moist upland forest in the Sunflower Bacon Project Area are currently overstocked and susceptible to insect and disease outbreaks, crown fire, and other disturbance processes affecting dense tree stands. There is a need to reduce forest density in the dry and moist upland forest.

## Condition Class

The Fire Regime Condition Class (FRCC) is an important measure in determining areas that will benefit from active management. Fire Regime Condition Class measures the degree of departure from ecological reference conditions. (Interagency Fire Regime Condition Class Guidebook, version 1.2, May 2005) The reference conditions used for the Sunflower Bacon analysis are the historic ranges of variability for vegetation-fuel class composition, fire frequency, and fire severity. In the Fire Regime Condition Class classification system, Fire Regime Condition Class 1 represents conditions similar to the reference conditions, with Fire Regime Condition Class 3 representing the greatest departure from the reference condition. Fire Regime Condition Class can be described at both the landscape and the stand levels.

The Fire Regime Condition Class representing all National Forest Lands within the Sunflower Bacon Project Area was calculated as condition class 2. The Sunflower Bacon project area is composed of 25% in condition class 1, 28% in condition class 2, and 47 % in condition class 3 for the dry upland forest (see section 3.3.2.1.1.1.2 for description of condition classes). The vegetative structure component of the Condition Class analysis is the attributing factor to the designation of condition class 2 and condition class 3 in these stands. Ladder fuels and the density of the canopy are the two major factors contributing to these higher condition classes.

Current vegetation profiles show that vegetation conditions will support fire behavior that can result in a higher than normal fire mortality. The current level of understory vegetation will support crown fire initiation by providing ladder fuels that will allow fire to travel into the crowns of dominant and co-dominant trees.

Without treatment, the Sunflower Bacon project area will continue to transition toward a condition class 3, where the risk of losing an ecosystem component inreases. There is a need to maintain or shift forest structures toward a Condition Class 1.

### Forest Plan Amendment

A Forest Plan Amendment to change the Habitat Effectiveness Index from the Forest Plan standard of 70 to the existing HEI of 69 is required for individual projects within the C3 Management Area for those action alternatives that convert satisfactory or marginal cover to lower quality cover or forage habitat.

The existing habitat effectiveness index for the Monument winter range is 69. Implementation of the Sunflower Bacon proposed action or alternative actions would result in a habitat effectiveness index of 69 across the winter range. The Forest Plan (page 4-152) currently reads:

> "Elk habitat will be managed on designated big game winter ranges to achieve a habitat effectiveness index of no less than 70, including discounts for open roads to motorized vehicular traffic, as described in wildlife Habitats in Managed Forests (Thomas and others 1979). The habitat effectiveness standard will be measured on an individual winter range basis".

The method prescribed for the calculation of Habitat Effectiveness Indices is described in Appendix C of the Forest Plan.

Although there is no anticipated change in habitat effectiveness index, an index of no less than 70 would not be achieved as described for the C3-Big Game Winter Range management area (Forest Plan, page 4-152).

### Summary of Purpose and Need

There is a need to shift dry upland forests to a more historic species composition as identified in Potential Natural Vegetation of the Umatilla National Forest (Powell 1998), and Potential Vegetation, Disturbance, Plant Succession, and Other Aspects of Forest Ecology (Powell 2000).

There is a need to increase the amount of old forest with a predominance of large trees in a single strata with frequent low-intensity fires on both dry and moist upland-forest by creating stand conditions, size and arrangement of trees and tree parts, that promote the development of this structural class.

There is a need to reduce stand densities in dry upland forest to levels established in Suggested Stocking Levels for Forest Stands in Northeastern Oregon and Southeastern Washington: an Implementation Guide for the Umatilla National Forest (Powell 1999) to reduce the potential for large-scale insect and disease outbreaks and reduce the potential of damage from an unwanted wildfire.

There is a need to modify current stand structures to maintain or move the landscape toward a Fire Regime Condition Class 1 thus reducing the threat of key ecosystem components being lost in the event of a wildfire.

To fully address the site-specific purpose and needs as stated above for the project and to implement the proposed action or alternative actions, an amendment is needed to bring the actions into consistency with the Umatilla National Forest Land and Resource Management Plan (Forest Plan).

## *Proposed Action*

In response to the purpose and need, the Heppner Ranger District proposes vegetation and fuels management on about 10,000 acres to improve the health, and vigor of the upland forest, and reduce the potential for future fires of uncharacteristic effects in upland forests. Vegetation management treatments include commercial thinning of about 2,400 acres, treatment of 40 acres of dead and downed woody material resulting from the 2000/2001 tussock moth outbreak, precommercial thinning of about 700 acres and treatment of surface fuels on about 10,000 acres. Reconstruction and maintenance of existing roads and construction of about 4 miles of temporary road would be required for access and log haul purposes.

The proposed action would require an amendment to the Forest Plan to change the Habitat Effectiveness Index standard in the C3 Management Area for the duration of the project. The amendment would change the HEI from 70 to the existing habitat effectiveness index of 69 only in the Monument winter range for the site-specific project called Sunflower Bacon. The proposed action would be implemented as early as the fall of 2006 with the duration of the project extending for approximately 5 to 7 years.

A detailed description of the proposed action and alternative actions can be found in Chapter 2.

## *Decision Framework*

Some material in this Environmental Assessment (EA) tiers to or incorporates by reference information from other existing documents, in order to avoid redundancy and to decrease the size of this document.

This EA documents the site-specific implementation of the Forest Plan. As a result, it is tiered to:

- The *Umatilla National Forest Land and Resource Management Plan Final Environmental Impact Statement, Record of Decision*, and the accompanying *Land and Resource Management Plan* (USDA 1990), dated June 11, 1990 (Forest Plan). The Forest Plan provides programmatic direction for the Forest, including the Sunflower Bacon project area. The Forest Plan does this by allocating parts of the Forest to different resource emphasis or “management areas”, and prescribing the type and intensity of management that may occur within each allocation. Relevant portions of the Forest Plan are summarized below and compliance with applicable Standards and Guidelines will be discussed in Chapter 3.

Forest Plan Amendment #2, Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (Eastside Screens) dated 1995. The Eastside Screens established additional management direction regarding area buffers, structural diversity, connectivity of late/old structure, retention of snags and downed wood, and goshawk nest-sites.

Forest Plan Amendment #10, The Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) dated February 24, 1995. PACFISH provided further protection for fish habitat, particularly regarding activities within riparian areas.

The Managing Competing and Unwanted Vegetation FEIS and its Mediated Agreement and Record of Decision (ROD) dated October 8, 1988. This EIS provides direction for implementation, mitigation, and monitoring of projects that propose to manage competing and/or unwanted vegetation through the use of herbicides, mechanical methods, or prescribed fire.

- *R6 FEIS: Pacific Northwest Region Invasive Plant Program Final Environmental Impact Statement, 2005*. Publication R6-NR-FHP-PR-02-05,USDA Forest Service, Pacific Northwest Region, Portland, Oregon. This EIS amended the *Umatilla National Forest Land and Resource Management Pan* by adding management direction relative to invasive plants. This project is intended to comply with the new management direction.

This EA also incorporates by reference the following:

- Umatilla National Forest Interim Snag Guidance letter dated April, 1993 (which provides direction on the number and distribution of snags to retain in harvest units);
- Environmental Assessment for the Management of Noxious Weeds and its Decision Notice dated May 24, 1995 (which identifies prevention and appropriate treatment methods for known noxious weed populations);
- Environmental Assessment for the Motorized Access and Travel Management Plan, Heppner Ranger District, dated July 1992 (which provides District-wide direction on the management of roads and off highway vehicle trails, both open and closed);
- Wall Ecosystem Analysis dated September 1995 (which is a watershed-level ecosystem analysis of current and reference conditions, along with recommendations for restoration);
- The Biological Assessment for Mid-Columbia steelhead trout and Steelhead trout critical habitat has been prepared and submitted to the regulatory agency (NOAA Fisheries). The consultation process will be completed before the project decision is finalized.
- National Fire Plan (August 2000) (developed with the intent of responding to severe wildland fires and their impacts to communities while addressing five key points: Firefighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance, and Accountability);
- Other sources of information cited in this EA and its analysis file, such as specialist reports, published studies, and books. The analysis file is available for review at the Heppner Ranger District, 117 S. Main, Heppner, Oregon, 97836.

## *Management Direction*

Analysis and documentation has been done according to direction contained in the National Forest Management Act (NFMA), the National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations, Clean Water Act, Clean Air Act, National Historic Preservation Act, and the Endangered Species Act.

### Umatilla National Forest Land and Resource Management Plan

The Umatilla National Forest Land and Resource Management Plan (Forest Plan) provides programmatic direction for the Forest, including the Sunflower Bacon Project Area. The Forest Plan does this by allocating parts of the Forest to different resource emphasis areas or management areas, and prescribing the type and intensity of management that may occur within each of the 25 management areas. The Management Areas for the Sunflower Bacon Analysis Area are shown on Figure 2-1. Compliance with goals and desired future conditions are discussed in the forest plan consistency section in Chapter 3 of this document. Compliance with Forest Plan standards and guidelines will be discussed in the specific resource sections, as applicable, in Chapter 3.

Table 1-1 shows the management areas that occur within the National Forest portion of the Sunflower Bacon Project Area. The proposed action would occur within six of the seven management areas: No activities would occur within the C8 – Grass Tree Mosaic management area.

Table 1-1. Management Areas in the Sunflower Bacon project area.

| Forest Plan Management Areas | Area (Acres) |
|---|---|
| A4 - Viewshed 2 | 66 |
| C1 – Dedicated Old Growth | 1,052 |
| C3 – Big Game Winter Range | 9,967 |
| C4 – Wildlife Habitat | 6 |
| C5 – Riparian and Wildlife | 492 |
| C8 – Grass-Tree Mosaic | 1174 |
| E1 – Timber and Forage | 6,937 |
| Private land | 52 |
| Total Acres | 19,798 |

The Proposed Action follows Forest Plan direction as amended by PACFISH (USDA/USDI 1995a). PACFISH (Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho and Portions of California) is ecosystem-based, aquatic habitat and riparian-area management strategies aimed at protecting and restoring Pacific salmon, steelhead, and bull trout populations.

As required by the Forest Plan (PACFISH amendment), riparian habitat conservation areas (RHCA's) would be delineated on the ground; no timber harvest activities would occur within riparian habitat conservation areas unless silvicultural practices are done to assure Riparian Management Objectives are meet.

## *Goals and Desired Future Conditions*

### A4 – Viewshed 2

(Forest Plan, pages 4-105 through 4-110): the goal is to: manage the areas seen from a travel route….where some forest visitors have a major concern for the scenic qualities (Sensitivity Level 2) as a natural appearing to slightly altered landscape.

Desired future condition: Management activities will be done with sensitivity to people's concern for scenic quality (Level 2), with vegetative manipulation conducted so that forest management activities remain visually subordinate in foregrounds of selected travel routes and sites. Management activities will be obvious in the middleground and background viewing area, but designed to compliment their surroundings. Forest stands will occasionally be logged in order to maintain long-term health and vigor, and to encourage a park-like, near natural appearance with big trees in the immediate foreground. Recreation opportunities will be mostly road oriented.

### C1 – Dedicated Old-Growth

(Forest Plan, pages 4-144 through 4-146): the goal is to provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or overmature forest stands, and promote a diversity of vegetative conditions for such species.

Desired future condition: Old-growth areas will be characterized by stands of naturally appearing overmature trees. Stands of mature trees may be included in the old growth category to provide a better distribution of this habitat type throughout the forest. Trees in these stands are relatively large (with many trees greater than 21 inches dbh); past the point of rapid growth, and some have visible evidence of decay and decline including mycorrhizal fungi and other microorganisms. Stands will be dispersed in quantities and sizes which meet the needs of dependant wildlife. These stands will contribute toward the forest diversity and aesthetic values.

## C3 – Big Game Winter Range

(Forest Plan, pages 4-151 through 4-154): The goal is to: “Manage big game winter range to provide high levels of potential habitat effectiveness and high quality forage for big game species.

*Desired future condition:* Big game winter ranges will appear as a mosaic of managed forests, brush patches, and large grasslands. Forested areas will contain a mix of harvested even-aged, uneven-aged, and natural stands, creating patterns of cover patches and forage areas for big game. Areas of early spring green-up and other forage changes due to prescribed fires and other means will occur in a mosaic pattern over the winter ranges; quality forage will be abundant because of management. As a result of management, quality big game habitat will be achieved and assist in meeting state big game populations and productivity goals, and Forest recreation objectives. During an “average” winter, most of the wintering big game will remain on public lands keeping impacts to private lands low.

## C4 – Wildlife Habitat

(Forest Plan, pages 4-158 through 4-162): The goal is to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphasis on size and distribution of habitat components (forage and cover for elk, and snags and dead and down materials for all cavity users). Unique wildlife habitats and key use areas will be retained or protected.

Desired future condition: The forest will be a mosaic of even-aged and uneven-aged stands dispersed in a manner to create a pattern of forage, and marginal and satisfactory cover for big game.

## C5 – Riparian (Fish and Wildlife)

(Forest Plan, pages 4-163 through 4-166): the goal is to maintain or enhance water quality and produce a high level of potential habitat capability for all species of fish and wildlife within the designated riparian habitat areas while providing for a high level of habitat effectiveness for big game.

Desired future condition: A near natural setting will predominate adjacent to the stream, with a wide variety of plant communities of various species, sizes, and age classes. In forested riparian zones, a continuous high tree canopy layer will be present and the forest will appear denser than in the surrounding land. Upper and mid-level conifer and hardwood canopy structure and lower shrub level will provide desired levels of stream surface shading, streambank stability, and satisfactory cover for big game.

## E1 – Timber and Forage

(Forest Plan, pages 4-178 through 4-181): The goal is to manage forest lands to emphasize production of wood fiber (timber) and encourage production of forage.

Desired future condition: Intensive management of forest for timber production and other commodity products will be apparent. The forest will primarily be a diverse mosaic of even-aged stands of many age classes, with trees somewhat uniformly spaced and well stocked. Regenerated stands will generally range from 20-40 acres. Stands managed using uneven-aged principles will also be apparent, particularly in the ponderosa pine types. A diversity of species will be present in plantations, but seral, more pest free species such as ponderosa pine, western larch, and lodgepole pine will be most evident. Larger trees will average 16-18 inches in diameter with the exception of trees left to meet cavity dependent wildlife needs and for the recruitment of large woody debris. Accumulated fuels will generally be light, and large destructive fire will seldom occur; prescribed fire will be an important management tool.

## Scoping

Scoping is the process the Forest Service uses to identify potential concerns associated with the proposed action, develop alternatives to the proposed action, and determine the extent of environmental analysis necessary for reaching an informed decision. Scoping was initiated when the project was listed in the Fall 2004 quarterly edition of the Umatilla National Forest Schedule of Proposed Activities (SOPA).

Scoping letters were sent on March 13, 2005 to two local tribal agencies and their representatives and 112 interested organizations, individuals, and other agencies that had indicated an interest in this type of project. Comment letters were received from 2 organizations and 1 State Agency: Oregon Natural Resources Council; League of Wilderness Defenders - Blue Mountains Biodiversity Project; and Oregon Department of Fish and Wildlife. At the request of Oregon Department of Fish and Wildlife a meeting was held between the Heppner Ranger District wildlife biologist and the Oregon Department of Fish and Wildlife Heppner Field Office biologist on April 8, 2005. This meeting was followed up by a field trip to the project area to discuss project design. A complete record of all scoping and the Forest Service's responses to scoping feedback are documented in the project record and the Sunflower Bacon analysis.

## Treaty Rights

The Forest Service, through the Secretary of Agriculture, is vested with statutory authority and responsibility for managing resources of the National Forests. No sharing of administrative or management decision-making power is held with any other entity. However, commensurate with the authority and responsibility to manage is the obligation to consult, cooperate, and coordinate with Indian Tribes in developing and planning management decisions regarding resources on National Forest System land that may affect tribal rights.

In 1855, two treaties that affect the Umatilla National Forest were signed between the United States government and several Indian tribes. The treaty with the Walla Walla, Cayuse, and Umatilla tribes and bands of Indians in Washington and Oregon Territories (today referred to as the Confederated Tribes of the Umatilla Indian Reservation) was signed on June 9, 1855. On June 26, 1855, a treaty was signed with the Tribes of Middle Oregon (these groups are now known as the Confederated Tribes of the Warm Springs Indian Reservation).

The Sunflower Bacon Environmental Assessment project area lies within the area ceded to the United States by the Tribes as a result of the 1855 Treaty. The treaty was subsequently ratified by Congress and proclaimed by the President in 1859. As a result of the treaty, elements of the Tribes' culture, such as tribal welfare, land and resources were entrusted to the United States government. Trust responsibilities resulting from the Treaty dictate, in part, that the United States government facilitates the execution of treaty rights and traditional cultural practices of the Tribes by working with them on a government to government basis in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the Tribes or the Federal Government.

Although no comments were received from the Tribes, the effects of the proposed action and alternatives were evaluated according to past statements of tribal interest that expressed concerns regarding similar projects and outlined Treaty Rights resources that could be affected by the project. These concerns have included:

- Potential impacts to fish habitat and population
- Implementation of adequate measures to protect the fishery resource and production in the John Day Basin
- Potential impacts of the proposed projects on salmonid species listed as threatened and endangered under the Endangered Species Act
- Impacts of the proposed projects on PACFISH and water quality standards, and measures the Forest Service will implement to adhere to those standards
- Impacts to wildlife in the usual and accustomed use areas
- Project impacts on archaeological sites and Traditional Cultural Properties

Because tribal trust activities often occur in common with the public, the Umatilla National Forest will strive to manage tribal ceded land in favor of the concerns of the tribes, as far as practicable, while still providing goods and services to all people.

## *Identification of Issues*

Using comments received from the public, the interdisciplinary team identified issues that were within the scope of this project.  Two of those issues were considered to be major or relevant to the development of alternatives to the proposed action.  Relevant issues are defined as "unresolved conflicts between alternative uses of available resources" [NEPA § 102(2)(E)].

## *Issues*

The Forest Service encourages public involvement in the identification of issues and development of alternatives through a process called 'scoping'.  During scoping, a description of this project's purpose and need and proposed action was distributed to the public through letters, personal contact, and the Forest's Schedule of Proposed Actions.  The public was invited to comment on the potential conflicts posed by the proposed actions.  These comments were then used to identify issues, alternatives to the proposed action, and the extent of environmental analysis necessary for making an informed decision.

In addition to issues identified through public response, the Interdisciplinary Team considered potential issues not identified by the public.  This was done by first identifying all the activities connected to accomplishing the proposed action.  Then the team identified potential cause/effect relationships associated with each type of action that could result in resource conflicts, relying in part on public comments from previous, similar projects.  The Interdisciplinary Team considered these potential conflicts or issues, together with those identified during scoping, to determine whether it required development of an alternative to the proposed action, needed mitigation measures, or whether it was beyond the scope of this project.  Issues are discussed below.  Comments were received from two organizations and one State Agency.  Two issues were considered to be major or relevant to the development of alternatives to the proposed action. A summary of these effects is presented at the end of Chapter 2, with a more detailed discussion in Chapter 3, Environmental Consequences.

## Major Issues

### Big Game Habitat in Winter Range and Forest Plan Amendment

Comments received during scoping expressed concerns about recent projects on the Heppner Ranger District that have amended the Forest Plan in order to treat vegetation within the Monument Winter Range. The Forest Plan sets a standard of habitat effectiveness (HEI) at 70 within the C3 management area. The Monument winter range is currently below Forest Plan standards for elk habitat effectiveness (HEI), and therefore the project would not raise HEI to forest plan standards.

Indicator: HEI (Road density, % total cover, % forage, % satisfactory cover, % marginal cover)

### Big Game Vulnerability

Some of the comments received in response to scoping indicated a concern for the effects on big game as a result of the proposed action. Vegetation management of thinning and underburning has the potential to reduce the quantity and quality of cover habitat and increase vulnerability for big game (elk) during the hunting seasons.

Indicator: Acres of cover treated, treatment type

## Other Issues

Issues that were not considered major, but which relate to existing regulations or which help to better understand the consequences of the proposed activities were considered other issues and will be tracked throughout this document. These other issues are generally of high interest or concern to the public or are necessary to understand the full extent of the alternatives.

### Soils

Soil disturbance would occur with the proposed activities that require ground-based equipment, particularly where mechanical fuels treatment follows mechanical thinning or harvest. Disturbance could include compaction, displacement, rutting, and exposure of the mineral surface to erosion due to removal of ground cover.

Indicator: detrimental soil condition, ground cover

### Water Quality

Members of the public have expressed concerns that activities within riparian areas could damage riparian habitat and water quality. Activities including harvest treatment, road work, and prescribed burning all have the potential to affect riparian habitat or water quality.

Indicator: road density, riparian road density, number of stream crossings, stream canopy cover, equivalent treatment area, aquatic habitat, management indicator species, and threatened, endangered, proposed, and sensitive species, and species of interest.

### Wildlife Habitat Quality

Members of the public have expressed concerns that the proposed action would change the composition and structure of some habitat types within the project area. Treatment activities would affect the structure and composition of forested habitats in the analysis area. Alterations in habitat would persist on the landscape for a number of years.

Indicators: late and old structure, dead wood habitat, management indicator species, threatened, endangered, proposed, and sensitive species, species of interest, Neotropical migratory birds, and riparian habitat

### Noxious and Invasive Weeds

The operation of heavy machines and fire activity often remove existing vegetation and disturb the soil, particularly where landings, temporary roads, and fire control lines are constructed. Noxious and invasive weeds are often more effective at establishing areas of disturbed or bare soil than native plants. Once established, the duration of effects could be long as many noxious weeds produce large quantities of seed or are capable of regenerating from a small segment of root. Public concern over noxious weed establishment and spread is high.

Indicator: potential for increase and spread of weeds

### Recreation

This area is a popular place for dispersed camping and hunting throughout the summer and fall. Treatments of thinning and burning can alter this experience both during treatment activities and for several years following these activities.

Indicator: number of dispersed camp sites within or immediately adjacent to the project area.

### Cultural Resources

Thinning, harvest, roadwork and fuels treatment, either mechanical or applied fire, have the potential to disturb artifacts of cultural significance, reducing their value for interpretation.

Indicator: protection of sites within project area

### Air Quality

Local residents have expressed concerns about prescribed burning contributing to short-term degradation to air quality and visibility. There are concerns that large wildfires burn uncontrolled and emit large amounts of smoke significantly degrading air quality and visibility. The Clean Air Act and Oregon Smoke Management Program establish the standard for smoke emissions that may be released during a prescribed burn that can affect air quality and visibility to local communities and the surrounding area.

Indicator: Particulate matter (PM10) released during wildfires and prescribed burning.

### Visual Quality

Many forest visitors are concerned about the scenic qualities of the forest. The treatment of the stands through thinning and burning will alter scenic quality.

Indicator: Form, line, color, and texture in the foreground, middle ground and background

### Viability of Timber Harvest

The viability of timber harvest can vary from one alternative to another based upon the costs and revenues associated with the alternative. For example, a requirement to use a more expensive logging system or a prescription that harvests a lower volume of timber per acre can reduce the viability of a harvest proposal. Conversely, a less expensive logging system or a higher harvest volume per acre can increase the viability of a harvest proposal.

Indicator: predicted bid rate

### Financial Efficiency

Financial efficiency of the alternatives will vary depending on the relative differences in revenues produced by the alternatives and the costs associated with generating the revenues.

Indicator: revenue/cost ratio (R/C) and financial present net value (PNV)

### Roadless Areas and Areas without Roads

A concern was expressed about units that were partially in roadless areas or undeveloped areas. No thinning or prescribed burning is proposed in this project within the Skookum Roadless Area. Thinning and burning are planned throughout the project area, including areas identified by Oregon Natural Resources Council as unroaded areas.

Indicator: natural integrity, apparent naturalness, solitude, remoteness, special features, manageability, and wilderness potential

## *Permits and Licenses*

None Required

## *Project Record*

A Project Record will be maintained at the Heppner Ranger District. Items contained in the Project Record include: Scoping letters sent to Tribes, other Governmental Organizations, public mailing lists; letters received during the Scoping process from concerned citizens; emails from concerned citizens and Forest Service IDT members; minutes of meetings; Sunflower Bacon Public Participation Plan; the project initiation letter and specialist reports. This Project Record may be reviewed at the Heppner Ranger District, 117 S. Main, Heppner, Oregon 97836.

## *Decisions to be Made*

The Umatilla National Forest Supervisor will serve as the deciding official for this project. The deciding official will decide whether to implement the proposed action, another action alternative, or the no action alternative, and his decision will be based on the following criteria:

> Forest stand stocking Levels: How well does the alternative achieve the desired species composition, forest structure, and stocking levels identified for dry upland forests?
>
> Short-term and long-term risks: How well does the alternative balance short-term risk of resource impacts from thinning and burning with the long-term risk of resource impacts from doing nothing?
>
> Which alternative(s) decrease fuel loads to the point of lessening the risk of uncharacteristic wildfire?

Depending on the alternative chosen, the Deciding Official will also determine:

> Whether a Forest Plan Amendment is necessary.

What, if any, measures are needed to mitigate potential undesired effects.

What monitoring requirements are needed to assure the selected alternative and mitigation are implemented as designed and effective.

## *Preview of Remaining Chapters*

### Chapter 2 – Alternatives

This chapter describes and compares the alternatives considered for the Sunflower Bacon Timber Sale, and provides a basis for choice among options by the decision-maker and the public. Some of the information is based upon the design of the alternative and some of the information is based upon the environmental, social, and economic effects of implementing each alternative.

### Chapter 3 – Environmental Consequences

This chapter summarizes the physical, biological, social, and economic environments of the affected project area and the potential changes to those environments due to the implementation of the alternatives discussed in Chapter 2. It also presents the scientific and analytical basis for the comparison of alternatives presented.

### Chapter 4 – Consultation and Coordination

This chapter lists the scoping letters that were sent out to what organizations or concerned citizens and responses received. It also lists the members of the Interdisciplinary Team and other consultants that prepared this environmental assessment.

### Bibliography

List of reference material cited by each specialist in writing their reports and this environmental assessment.

### Appendices

This section contains description of best management practices, unit data, Forest Plan SCREENS compliance, roads analysis, soils data by unit, and descriptions of past present and reasonably foreseeable future projects considered in cumulative effects analysis.

# Chapter 2

## *Introduction*

Chapter 2 describes and compares the No Action, Proposed Action, and two alternative ways to manage forest vegetation in the Sunflower Bacon Project Area. These alternatives were designed to address or resolve the relevant issue identified through public involvement and cause/effect analysis. A team of resource specialists (Interdisciplinary Team) developed these alternatives within the framework of the Forest Plan and applicable laws. This chapter is divided into the following sections:

- Alternative Development Process which includes a description of each alternative considered.
- Potential Knutsen-Vandenburg (KV) Projects
- Comparison of Alternatives

## *Range of Alternatives*

The alternatives for this project were designed to express a range of possible actions. The interdisciplinary team developed the range of alternatives and mitigation measures presented in this chapter, based on the Purpose and Need and the major issues described in Chapter 1.

An adequate range of alternatives is one that fully meets the Purpose and Need and addresses the major issues. An alternative to the Proposed Action must: (1) address one or more major issues; and (2) meet the Purpose and Need. An action alternative that does not meet both criteria may be eliminated from detailed study.

Other influences on the development of alternatives included: Forest Plan goals and objectives, Forest Plan standards and guidelines, consultation requirements under the Endangered Species Act, and other federal and state laws and regulations. Considering these influences, the interdisciplinary team developed alternatives that address a range of treatments, management requirements, mitigations, and effects on resources.

## *Alternatives Considered in Detail*

### Alternative 1:

#### Objectives

Alternative 1 is a No Action alternative that would allow previously approved (on-going) activities to proceed, but none of the proposed treatments included in the Sunflower Bacon Proposed Action would be implemented. Alternative 1 would allow natural processes to continue, with the associated risks and benefits and provide a baseline for comparison with other alternatives.

#### Description

Current biological and ecosystem functions would continue at their present rate. Existing management direction, including activities such as livestock grazing, fire suppression, firewood cutting, recreation, monitoring, and road maintenance would continue at their present levels.

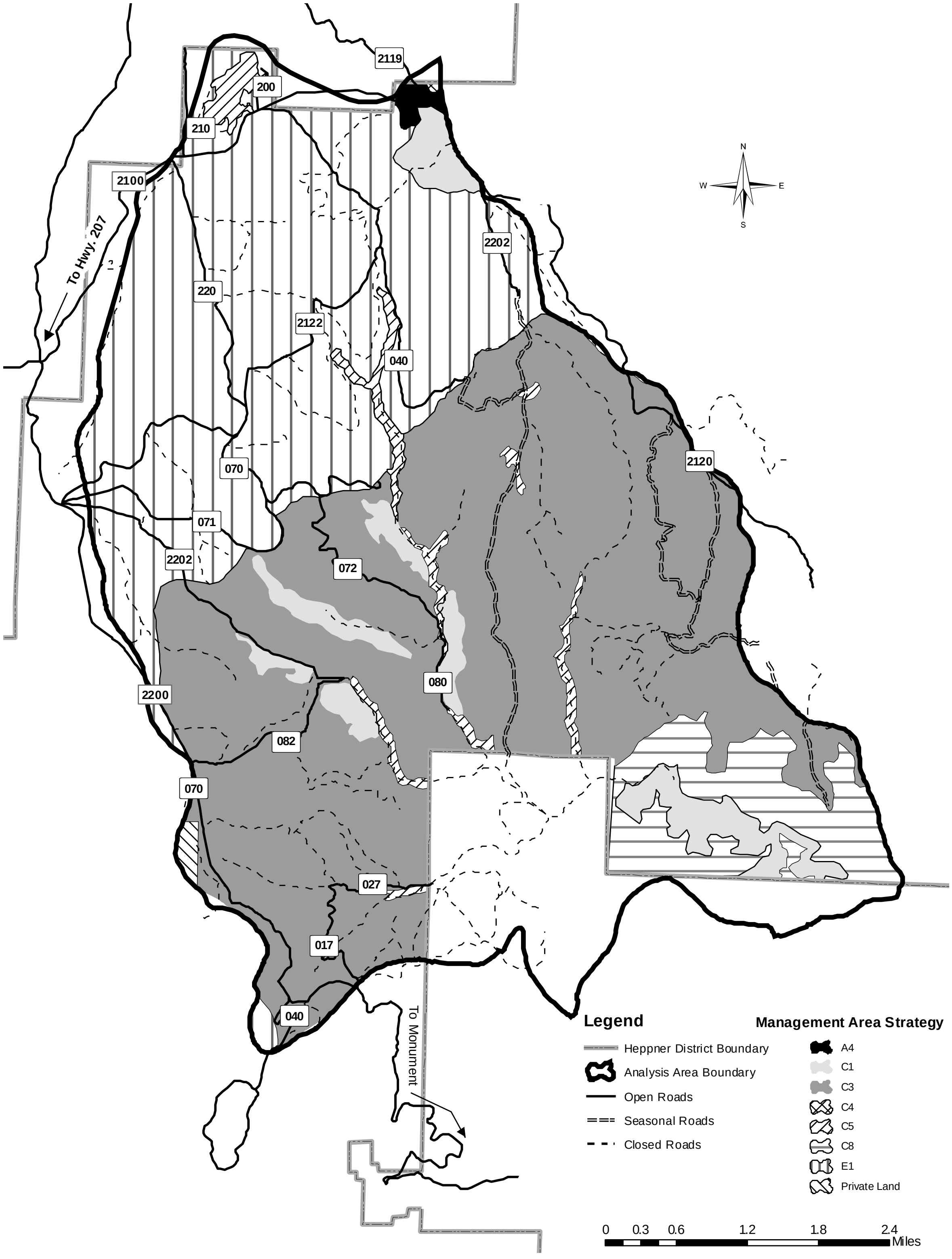


Figure 1. Sunflower Bacon Management Area Designation

# Alternative 2:

## Objectives

The treatments in Alternative 2, the Proposed Action, respond to the Purpose and Need for the Sunflower Bacon project. They are designed to accomplish the following objectives:

Modify upland-forest stands to a species composition and structure compatible with the historical range of variability. Thinning treatments are used to reduce forest density, modify species composition, and transform some of the multi-layered old forest structure into single-layer old forest structure.

Reduce fuel loading and forest density to a level that facilitates future reintroduction of low-intensity surface fire, while also reducing density-dependent tree mortality caused by insects and disease.

Alter species composition, structural stage and canopy closure to shift Fire Regime Condition Class 2 or 3 to Condition Class 1. Maintain condition class one through the use of prescribed fire.

Recover commercial timber value and use the resulting revenue to help pay for noncommercial thinning, noxious weed control and other restoration activities.

## Description

This alternative proposed a variety of management treatments for upland forest sites, as described below: (Refer to Appendix B – Unit Data Sheet, for specific units)

### *Commercial Thinning*

Commercial thinning would occur on approximately 2,456 acres. Commercial thinning is designed to reduce existing fire hazard by removing ladder fuels, to improve insect and disease resistance by reducing tree density, and to improve the vigor and longevity of early-seral tree species such as ponderosa pine.

Commercial thinning would reduce tree density to recommended stocking levels for each plant association. Diseased, suppressed, or deformed trees would be preferentially removed in order to improve forest health. Silvicultural prescriptions would favor retention of early-seral species such as ponderosa pine and western larch, along with healthy Douglas-fir, that are most resistant to fire, drought stress, and insect attack. Commercial thin treatments would leave a fully stocked stand and no live trees over 21 inches dbh would be removed. Snags and down wood would be retained at levels specified by the Forest Plan and USDA Forest Service (1993). Thinned material that is merchantable (i.e. sawlogs, chips, or hog fuel) would be sold, producing an estimated volume of 14,890 hundred cubic feet (Ccf).

Whole-tree timber harvest using skidders would occur on approximately 1747 acres; ground-based systems using harvesters and forwarders would occur on approximately 709 acres.

#### Connected Actions to Commercial Thinning

Activity fuel reduction on 234 acres would be treated either mechanically or by prescribed fire. These 234 acres are areas outside the landscape burn blocks. The remaining 2,222 acres of commercially thinned stands would treat activity fuels within the landscape burning portion of this project.

Burn control lines would be constructed along 4.3 miles of thinning unit boundaries on the 234 acres. After the activity burning is complete these lines would be rehabilitated as necessary.

Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 4 miles of temporary roads constructed, 33 miles of open road maintained and 8 miles of open road reconstructed. Closed roads re-opened for temporary access would be re-closed after haul is completed. Temporary roads would be obliterated after haul is completed.

### *Salvage Harvesting*

Treat 40 acres (included in the 2456 acres of commercial thinning) of dead and downed woody material resulting from the 2000/2001 tussock moth outbreak (portions of Units 56 and 57). This salvage treatment is designed to reduce future fire hazard by removing insect-killed trees, ladder fuels and down-woody material.

### *Noncommercial Thinning*

Noncommercial thinning would occur on approximately 1,646 acres; 704 acres outside harvest units and the 942 acres within harvest units. Conifer saplings, generally up to 7 inches in diameter at breast height (dbh), and juniper trees less than 14 inches diameter would be thinned to promote tree vigor, improve insect and disease resistance, restore or maintain a sustainable species composition, increase water availability, increase forage for big game and domestic livestock, and decrease fire hazard by reducing ladder fuels. Noncommercial thinning units would be either cut by hand using chainsaws or by mechanical means. Stands would remain fully stocked and no reforestation would be required. Created slash would either be limbed and bucked to within 18 inches of the ground or mechanically treated (grapple piling, chipping or slashbusting).

Trees noncommercially thinned may have commercial value dependent upon tree diameter and size limitations of equipment or processing. Generally, trees that are 7 inches dbh or smaller are considered not to have commercial value, though in recent years smaller diameters have been used for chips, hog fuel, and non-sawtimber products. The market for small diameter trees is undependable, so it is unknown at this time whether trees below 7 inches diameter at breast height (dbh) would be sold.

### *Landscape Burning*

Approximately 10,196 acres would be landscape burned to reduce surface fuels. This would include burning of activity fuels on the remaining 2,222 acres where commercial thinning would occur and 7,974 additional acres of the project. Underburning would reduce small tree density and accumulated ground fuels while reintroducing fire into the ecosystem.

#### Connected Actions to Landscape Burning

Burn control lines would be constructed along 1.2 miles of thinning units and 4.4 miles of hand or wet line would be constructed along precommercial thin units. These burn control lines create fuel breaks to aid in control of fire within specific burn blocks. These lines would be rehabilitated as necessary.

### *Forest Plan Amendment*

This alternative would also require the Forest Supervisor to amend the Umatilla National Forest Land and Resource Management Plan with a Forest Plan Amendment to reduce the Forest Plan’s habitat effectiveness index standard for this project from 70 to 69. The standard reads:

> “Elk habitat will be managed on designated big game winter ranges to achieve a habitat effectiveness index of no less than 70, including discounts for open roads to motorized vehicular traffic, as described in Wildlife Habitats in Managed Forests (Thomas and others 1979). The habitat effectiveness standard will be measured on an individual winter range basis” (Forest Plan page 4-152).

The method prescribed for the calculation of Habitat Effectiveness Indices is described in Appendix C of the Forest Plan. The habitat effectiveness index for a given area depends upon three habitat characteristics: (1) percent of potential elk use in response to cover for the land type, (2) road density, and (3) the quality of cover, defined as either satisfactory or marginal cover. The habitat effectiveness index is based upon quantitative analysis of each of these three components.

The habitat effectiveness analysis for this project showed that the proposed project would not change the habitat effectiveness index within the affected winter range. The existing habitat effectiveness index is 69, and would remain at 69, below the Forest Plan standard of 70, after the project. However, analysis showed that alternative 2 would affect the quality of cover, changing some of the satisfactory cover to marginal cover and some of the marginal cover to forage. This represents a decrease in habitat quality. Because the proposed change reduces the quality component of the habitat effectiveness index, the proposed project is not in conformance with Forest Plan Standards and Guidelines. In order to proceed with the proposed project, the Forest Supervisor proposes to amend the Forest Plan following procedures described in Forest Service Handbook 1909.12, Chapter 5, Forest Plan Implementation and Amendment Process. The reduction of this standard would apply only to the Monument winter range and the site-specific project called Sunflower Bacon.

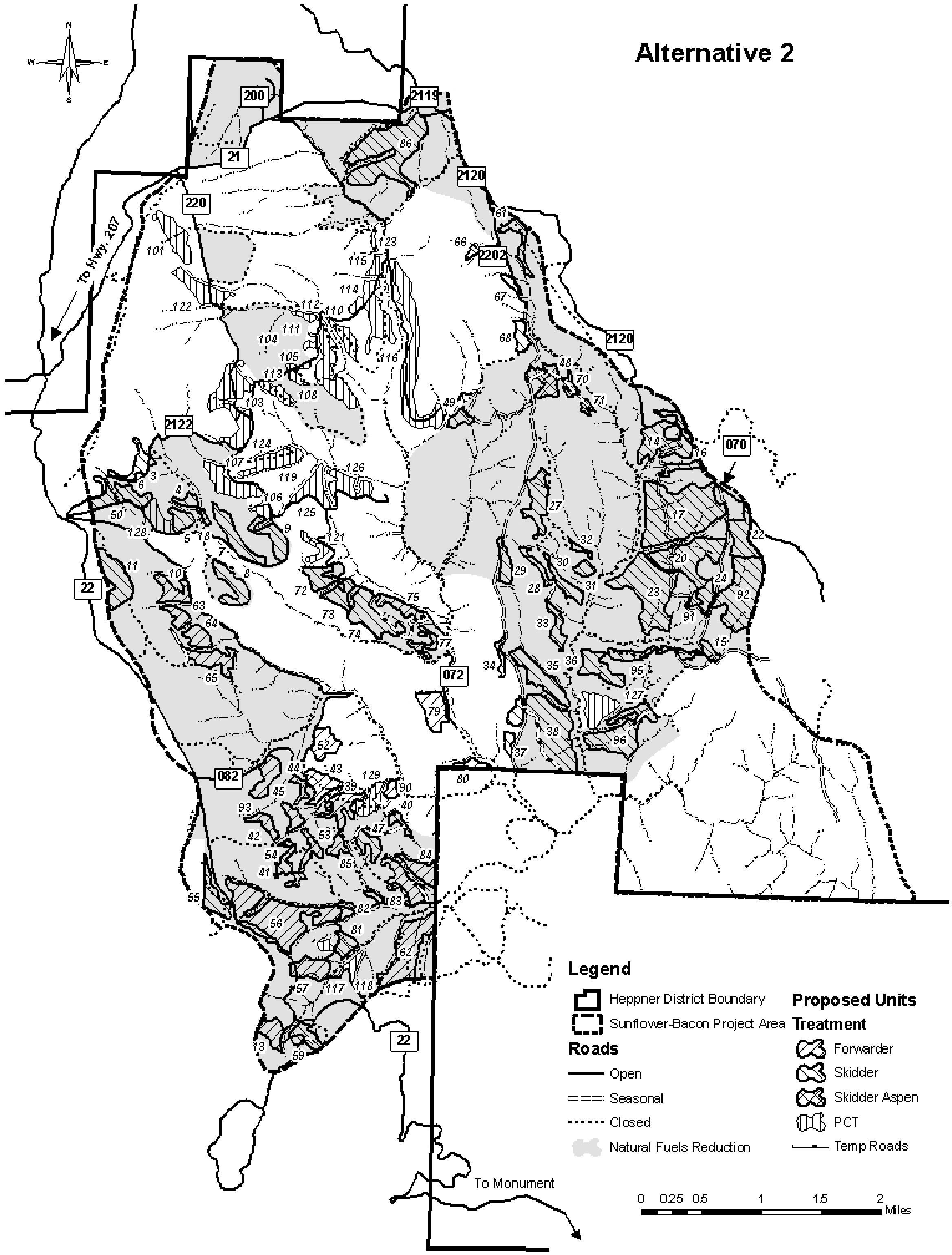


Figure 2. Alternative 2 – Proposed Action

## Alternative 3

### Objective

The objective of this alternative is to achieve the vegetation and fuels objectives of the purpose and need while eliminating the need for a Forest Plan amendment of the HEI standard in the C3 winter range management area. This alternative is designed to maintain existing satisfactory and marginal wildlife cover at existing levels within the C3 winter range management area.

Proposed treatments included in Alternative 3 respond to land and resource management objectives established for the Sunflower Bacon project, and to a lesser extent, meet the objectives previously described for Alternative 2.

### Description

Twenty-one units were dropped predominately for Satisfactory and Marginal Wildlife Cover (Units 14, 15, 17, 23, 28, 30, 37, 38, 39, 41, 45, 54, 66, 73, 74, 81, 83, 90, 92, 93, and 129). This alternative features less temporary road construction than alternative 2. Alternative 3 includes all of the management practices and activities stated in Alternative 2, with differences noted below:

#### *Commercial Thinning*

Commercial Thinning would occur on approximately 1,604 acres. Thinned material that is merchantable (i.e. sawlogs, chips, or hog fuel) would be sold, producing an estimated volume of 9,488 hundred cubic feet (Ccf).

Whole-tree timber harvest using skidders would occur on approximately 1,013 acres; ground-based systems using harvesters and forwarders would occur on approximately 591 acres.

##### Connected Actions to Commercial Thinning

Activity fuel reduction on 243 acres would be treated either mechanically or by prescribed fire. These 243 acres are areas outside the landscape burn blocks. Alternative 3 dropped some of the natural burning blocks, therefore an increase of individual units would require mechanical treatment. The remaining 1,361 acres of commercially thinned stands would treat activity fuels within the landscape burning portion of this project.

Burn control lines would be constructed along 7 miles of thinning unit boundaries on the 243 acres. After the activity burning is complete these lines would be rehabilitated as necessary.

Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 2.4 miles of temporary roads constructed, 32 miles of open road maintained, and 8 miles of open road reconstructed. Closed roads re-opened for temporary access would be re-closed after haul is completed. Temporary roads would be obliterated after haul is completed.

#### *Salvage Harvest*

Treat 40 acres (included in the 1,604 acres of commercial thinning) of dead and downed woody material resulting from the 2000/2001 tussock moth outbreak (portions of Units 56 and 57).

#### *Noncommercial Thinning*

Noncommercial thinning would occur on approximately 1,362 acres; 681 acres outside harvest units and 681 acres within harvest units.

### Landscape Burning

Approximately 8,617 acres would be landscape burned to reduce surface fuels. This would include burning of the activity fuels on the remaining 1,361 acres where commercial thinning would occur and 7,256 additional acres of the project.

#### Connected Actions to Landscape Burning

6.5 miles of burn control lines would be constructed using hand or wet line along precommercial thin units that are adjacent to a burn block. These burn control lines create fuel breaks to aid in control of fire within specific burn blocks. These lines would be rehabilitated as necessary.

### Forest Plan Amendment

No amendment to the forest plan would be required under this alternative because existing satisfactory and marginal wildlife cover would be maintained within the C3 winter range management area. Treatment would occur in cover stands; however, cover would not be converted to lower quality cover habitat or forage.

### Mitigation Measures

Road 2120-070 (1.1 miles) is proposed to change from seasonal to closed.

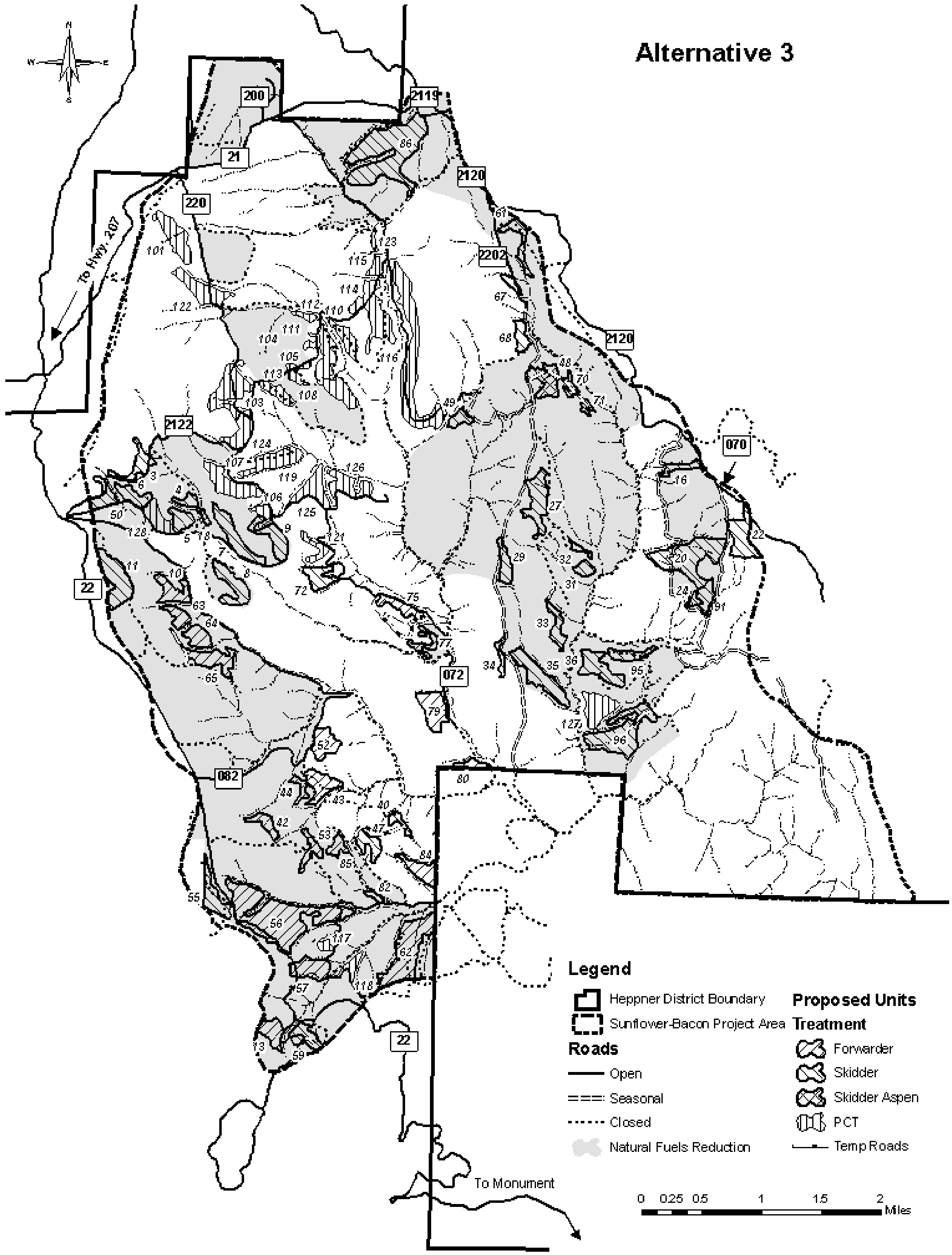


Figure 3. Alternative 3

# Alternative 4

## Objectives

The objective of this alternative is to achieve the vegetation and fuels objectives of the purpose and need while reducing big game vulnerability. Some comments received expressed concern over the level of vegetative treatment that would occur in the project area and how these vegetative treatments would increase big game vulnerability to hunting in the late summer and fall. Comments included discussions of increased use of the area in recent years and the road system. This alternative responds to these concerns by not treating the existing satisfactory wildlife cover and using a more complex variable density retention thinning in a portion of the existing marginal cover stands to create a mosaic pattern of cover and forage within the units in the Monument winter range area. These units would be classified as forage after treatment, but patches of denser habitat would be maintained, reducing sight distance. Large units in the eastern portion of the analysis area would be left untreated and FS road 2120-070 would be closed to mitigate cover reduction and reduce vulnerability in the area.

Ten units were dropped primarily to maintain existing satisfactory wildlife cover (Units 15, 17, 28, 39, 41, 45, 54, 66, 81, and 92) and 11 units would be treated with variable density retention thinning (Units 14, 23, 30, 37, 38, 73, 74, 83, 90, 93 and 129).

## Description

Proposed treatments included in Alternative 4 respond to the Forest Plan objectives established for the Sunflower Bacon project and, to a lesser extent, meet the objectives previously described for Alternative 2. Alternative 4 includes all of the management practices and activities stated in Alternative 2, with differences noted below:

### *Commercial Thinning*

Commercial Thinning would occur on approximately 1,581 acres.

Variable density retention thinning would occur on 476 acres. Variable density retention thinning would leave patches of ¼ to ½ acre in size with residual basal area ranging between 20 $ft^2$/acre to 110 $ft^2$/acre. This treatment would occur in areas determined to meet marginal wildlife cover criteria within the C3 management area. The ¼ to ½ acre mosaic of vegetation and openings would provide increased cover for big game compared to open, park-like stands, thus reducing vulnerability.

Thinned material that is merchantable (i.e. sawlogs, chips, or hog fuel) would be sold. The 1,581 acres of commercial thinning and the 476 acres of the variable density retention thinning would produce an estimated volume of 12,719 hundred cubic feet (Ccf).

Whole-tree timber harvest using skidders would occur on approximately 1410 acres; ground-based systems using harvesters and forwarders would occur on approximately 647 acres.

#### Connected Actions to Commercial Thinning

Activity fuel reduction on 273 acres would be treated either mechanically or by prescribed fire. These 273 acres are areas outside the landscape burn blocks. Alternative 4 dropped some of the natural burning blocks; therefore, there is an increase of individual units to be treated by mechanical treatment. The remaining 1,784 acres of commercially thinned and variable density thinned stands would treat activity fuels within the landscape burning portion of this project.

Burn control lines would be constructed along 4.8 miles of thinning unit boundaries on the 273 acres. After the activity burning is complete these lines would be rehabilitated as necessary.

Roads used for access and haul of forest products would include 15.7 miles of closed road to be temporarily reopened, 3.8 miles of temporary roads constructed, 33 miles of open road maintained, and 8 miles of open road reconstructed. Closed roads re-opened for temporary access would be re-closed after haul is completed. Temporary roads would be obliterated after haul is completed.

### *Salvage Harvest*

Treat 40 acres (included in the 1,696 acres of commercial thinning) of dead and downed woody material resulting from the 2000/2001 tussock moth outbreak (portions of Units 56 and 57).

### *Noncommercial thinning*

Noncommercial thinning would occur on approximately 1,485 acres; 704 acres outside harvest units and 781 acres within harvest units.

### *Landscape Burning*

Approximately 9,347 acres would be landscape burned to reduce surface fuels. This would include burning of the activity fuels on the remaining 1,784 acres where commercial thinning would occur and 7,563 additional acres of the project area.

#### Connected Actions to Landscape Burning

Burn control lines would be constructed along 1.2 miles of thinning units along the outer boundary of a burn block and 5.7 miles of hand or wet line would be constructed along precommercial thin units that are adjacent to burn blocks. These burn control lines create fuel breaks to aid in control of fire within specific burn blocks. These lines would be rehabilitated as necessary.

### *Amendment to the Forest Plan*

This alternative would also require the Forest Supervisor to amend the Umatilla National Forest Land and Resource Management Plan with a Forest Plan Amendment to reduce the Forest Plan's habitat effectiveness index standard for this project from 70 to 69.

Analysis showed that alternative 4 would affect the quality of cover, changing some of the marginal cover to forage. This represents a decrease in habitat quality. Because the proposed change reduces the quality component of the habitat effectiveness index, the proposed project is not in conformance with Forest Plan Standards and Guidelines. In order to proceed with the proposed project, the Forest Supervisor proposes to amend the Forest Plan. The reduction of this standard would apply only to the Monument winter range and the site-specific project called Sunflower Bacon.

### *Mitigation Measures*

Road 2120-070 (1.1 miles) is proposed to change from seasonal to closed to reduce big game vulnerability during the hunting seasons.

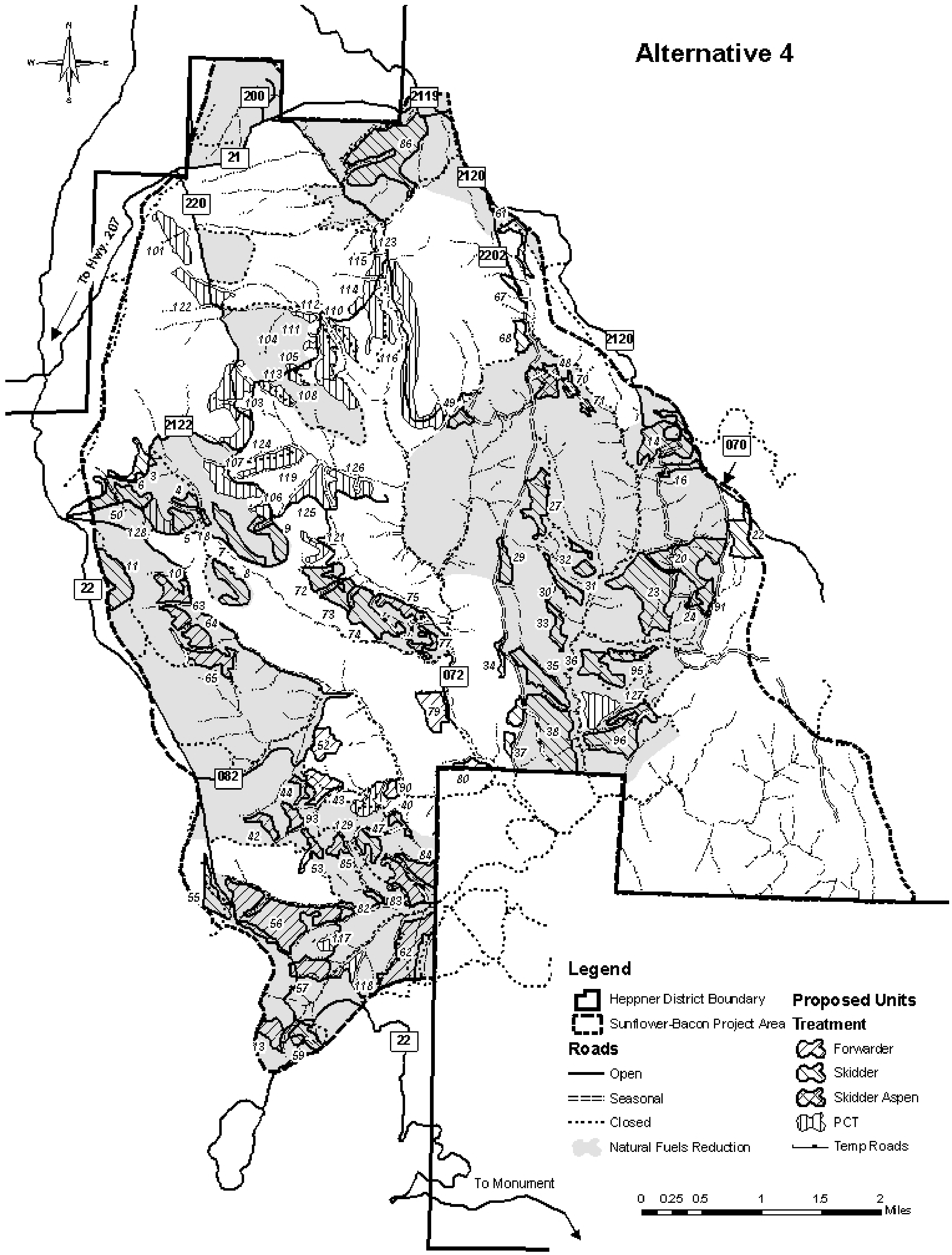


Figure 4. Alternative 4

## *Alternatives Considered but Eliminated from Detailed Study*

### Diameter Breast Height Size Limitation

One respondent suggested to not commercially log trees larger than 8 to 10 inches in diameter at breast height in Dedicated Old Growth, Big Game Winter Range, Wildlife Habitat, Riparian Zones and Viewshed Management Areas.

This alternative, suggested during the scoping period, would place an 8 to 10 inch diameter limit in five Land and Resource Management Areas. This alternative was dropped from further consideration for the following reasons:

A4 – Viewshed 2 – There are 18 acres of A4 in Unit 86 along the 21 road. Using an 8 to 10 inch diameter limit would meet the Purpose and Need to reduce stand densities but would not meet the objective of the A4 management area. To reach the desired stand density nearly all trees at or below the 8 to 10 inch size class would need to be removed. The A4 management area objective is to use uneven-aged management to create a mix of size classes of trees with an emphasis on retaining large diameter trees within a multi-age stand. Removing all trees below 10 inch diameter would not retain trees in all size classes.

C1 – Dedicated Old Growth – no timber harvest would occur in the C1 management area.

C3 – Big Game Winter Range – Using an 8 to 10 inch diameter limit would not meet the Purpose and Need to reduce stand densities to improve vigor of remaining trees, to shift or maintain Fire Regime Condition Class; shift species composition, or modify stand structures. Thinning of trees larger than 8 to 10 inch diameter is required to move stands toward the recommended stand density, species composition, and stand structure as described above. Modeling of treated and untreated stands demonstrates that treated stands would develop into higher quality big game habitat (see vegetation report).

C4 – Wildlife Habitat – no timber harvest would occur in the C4 Management Area.

C5 – Riparian and Wildlife – a total of three acres in Units 27 and 80 are located in C5, but are outside of designated riparian habitat conservation areas. These areas are not located near water, so harvest in these areas would not affect water quality. Using an 8 to 10 inch diameter limit would not meet the Purpose and Need to reduce stand densities to improve vigor of remaining trees; to shift or maintain Fire Regime Condition Class, shift species composition, or to modify stand structures.

### No New or Temporary Roads

Another suggested alternative during scoping was to refrain from creating any new or temporary roads for the removal of timber products within the project area. An alternative to extract logs via helicopter could eliminate the need for temporary roads. This alternative was considered and determined not feasible based on the limited volume and value of product that would be removed. In areas where only light thinning is indicated in the silvicultural prescriptions operability is limited by economics. This means that areas that could be treated using ground-based equipment could not be harvested using a helicopter. In addition, the use of helicopters would create a higher potential for snag loss.

No new permanent roads would be constructed under the action alternatives. Most units designated in each of the action alternatives have road access. Temporary roads would be used to, and within, some units to allow for harvest activities. After a temporary road has served the purpose, the purchaser would give notice to Forest Service and would remove culverts, eliminate ditches, outslope roadbeds, remove ruts and berms, effectively block the road to normal vehicular traffic, subsoil and/or build cross ditches and water bars, as determined by the Forest Service. When culverts are removed, associated fills shall also be removed to the extent necessary to permit normal maximum flow of water. Temporary roads are used only for the life of the project and rehabilitation begins before the purchaser leaves the area. The temporary roads used in this project would be used only in areas where environmental effects are expected to be consistent with the Forest Plan. Project design and rehabilitation measures would be used to alleviate the potential for environmental effects. Therefore, there is no major issue to drive the development of this alternative.

## Use of Fire as a Thinning Tool

It was suggested that prescribed fire could be used to reduce stocking densities instead of commercial thinning. Prescribed burning would remove fine flashy fuels; however, it would not be selective with regard to desired tree species composition, stocking density, or spatial distribution of trees. Given the amount and distribution of fuel, prescribed fire could not be implemented as a thinning tool. The objective of the project is to create a stand structure that would allow fire to be returned to the system. Once stocking densities are reduced to desired ranges prescribed fire would be used to reduce fuel loads, control species composition, and maintain preferred stocking densities. Prescribed fire would be used once stocking density, spatial distribution, species composition and ladder fuel and stand structure are within a pattern that would allow the use of prescribed fire to be introduced to the stand without causing ecosystem damage.

## No Treatment within the C3 – Big Game Winter Range

The interdisciplinary team considered an alternative that avoided treatments within the C3 – Big Game Winter Range area to avoid reducing habitat quality for elk in this area. This alternative was dropped from further consideration because it would not meet the purpose and need. It would have an insignificant effect on improving sustainability or moving toward historical ranges for species composition, forest structure, and density. Similar to no action, the vast majority of the area would continue to move away from historical ranges and result in a higher risk of uncharacteristic wildfire effects.

The interdisciplinary team did develop an alternative to address big game habitat within the C3 management area. Alternative 3 was developed specifically to address big game habitat quality by eliminating harvest treatment in areas identified as either satisfactory or marginal cover within the C3 management area. This resulted in eliminating about 900 acres of commercial thinning, no change of HEI, and no requirement for a site specific forest plan amendment to implement the project.

## Increase Habitat Effectiveness Index

Some respondents suggested considering an alternative that increased habitat effectiveness index above 70 for elk. Habitat effectiveness for elk is a relative index of the amount and arrangement of cover and forage. The model consists of three compensatory factors; open road density, distribution of cover-forage, and cover quality, to quantify effects on habitat (Thomas 1979). The current habitat effectiveness index for the Monument winter range is 69. The Forest Plan standard for HEI in winter range habitat is 70.

Holding other factors constant, reducing open road density will increase the habitat effectiveness index in a given area. Currently, there are 46.3 miles of road open within the Monument Winter Range during the winter use period. This results in an open road density of 0.5 miles per square mile in the winter range.

A sensitivity analysis was done to estimate how many miles of road would have to be closed in the winter to raise the post-project habitat effectiveness index to the Forest Plan standard. For the existing condition, the analysis found that 6.7 miles of open road would have to be closed to result in a habitat effectiveness index of 70.

Based on the sensitivity analysis, the open road density of 0.5 miles per square mile, and anticipated low road use in the winter; it is evident road density alone is not the major factor contributing to the current habitat effectiveness index for the Monument Winter Range.

Creating additional patches of forage, within cover patches, scattered across the winter range, could increase the amount and distribution of cover-forage and therefore increase the habitat effectiveness index in the Monument winter range. However, this would require a substantial amount of timber harvest to increase the amount of shrubs, grasses and forbs to provide forage. In addition, forage patches would need to be widely distributed over a larger area to improve the habitat effectiveness index.

The amount of cover quality generally relates to the proportion of satisfactory cover to marginal cover in the analysis area; a larger proportion of satisfactory cover would provide higher cover quality. Currently, there is three times as much marginal cover in the Monument Winter Range than there is satisfactory cover. This condition is inherent to the dry forest type, lower elevation, south-facing slopes, and overall low site productivity in the Monument winter range. Essentially, the capability of the site to develop and sustain a large amount of satisfactory cover is questionable because of the dry site characteristics and low site productivity in the area. Closing additional open roads in the Monument winter range, during the winter use period could slightly increase HEI in the short term. However, the redistribution of cover and forage in the winter range would have a more lasting increase to HEI in the Monument winter range. This alternative was eliminated because it would require substantially more harvest, particularly within and adjacent to marginal habitat, than identified in the proposed action to effectively increase the habitat effectiveness index above 70 in the Monument winter range.

## *Potential Knutsen-Vandenburg Projects*

The following projects and opportunities have been identified as possible candidates to receive funding under the Knutsen-Vandenburg Act. These are commonly referred to as KV funds and are collected from the sale of timber. If harvest occurs, KV funds might not be generated for all enhancement projects. If KV funds are limited, other funding sources would be necessary, or the unfunded project would not be implemented.

Sale area enhancement opportunities associated with the action alternatives include:

- Noncommercial thinning
- Noxious Weed control
- Treatment of debris created by noncommercial thinning
- Underburning ponderosa pine stands to maintain structure
- Installation of guardrails/gates on roads in the area to improve road closure effectiveness
- Fence reconstruction

## *KV Projects Requiring Future Analysis*

These are opportunities that may be pursued in the future and are not currently proposed under the action alternatives. These projects are not reasonably foreseeable future projects. If these projects are initiated, additional NEPA analysis would be required:

- Installing fencing around treated aspen stands and planting aspen.
- Range improvement fence construction and reconstruction
- Replacement and/or removal of fish barriers (culverts)
- Decommissioning roads no longer needed (as identified in the Roads Analysis for this project).
- Installing guardrails/gates on other closed roads in the area to improve closure effectiveness.
- Planting hardwoods in riparian areas.
- Maintaining instream structures.

- Reconstruction of water sources.

### *Management Requirements and Project Design Elements*

The Umatilla National Forest uses two general types of mitigation: management requirements and project design elements. Management requirements are standards that are established to protect forest resources, and are implemented during or after the projects to meet Forest Plan and other direction. Project design elements are actions designed for a specific project to reduce or prevent undesirable effects from proposed activities. Project design elements can include avoiding the effect, minimizing the effect by limiting the action, rectifying the effect, reducing the effect through maintenance, or compensating for the effect. The action alternatives include the following management requirements and project design elements. Unless noted otherwise in the decision document, these management requirements and project design elements would be incorporated into each of the action alternatives for implementation.

## Management Requirements

The management requirements would be implemented to meet the stated objectives. These requirements represent standard operating procedure for the protection of forest resources. The source for the requirements is the Forest Plan guidelines and provisions developed by the Umatilla National Forest.

## Project Design Elements

Project design elements are practices that the interdisciplinary team developed during this analysis to address site-specific environmental concerns that were not sufficiently addressed by existing management requirements.

1. All riparian areas would be protected from harvest activities during layout using PACFISH and Best Management Practice Guidelines. No commercial harvest would occur within PACFISH Riparian Habitat Conservation Areas (300 feet on each side of class 1 and 2 [fish-bearing streams], 150 feet for Class 3 streams [non-fish bearing perennial streams], and 100 feet for Class 4 [intermittent] streams and springs, seeps, ponds, and bogs less than one acre.) The exception to this is the treatment of Unit 18 which is an aspen stand. Within aspen stands designated for conifer removal, trees may be removed from the Riparian Habitat Conservation Area in a manner that soil exposure from equipment would be avoided (eg. logging over frozen ground).
2. Unique habitats (such as talus, rocky outcroppings, scab habitats, cliff faces, and meadows) would be protected.
3. If a tree is felled into a Riparian Habitat Conservation Area or unique habitat buffer, the portion inside the protected area would be left in place. In the event that trees are inadvertently damaged within a riparian area, trees that are determined to be a safety hazard would be felled.
4. Project specific Best Management Practices are incorporated into the project design to meet Clean Water Act requirements. The actions proposed for this project were designed during planning to protect water quality. For example, the design includes no harvest and no ignition in riparian areas. Temporary roads are proposed in riparian areas only when necessary to reach specific units. Actions in riparian areas have site-specific mitigations to insure that water quality is not compromised (see Appendix A).
5. Ground-based equipment would operate in areas where the average slope is less than 35 percent in order to reduce the potential for soil disturbance.
6. Where conditions and safety permit, trees would be felled away from riparian areas, residual conifers, large broken or hollow top snags, dispersed campsites, research plots (ecology plot center markers and condition and trend transect markers) and improvements (i.e. fences, stock ponds, section corner monuments, etc.).
7. During harvest activity cattle would be prevented from passing between allotments or pastures.
8. Equipment crossing ephemeral draws would be confined to designated crossings.

9. Use of heavy equipment would be suspended when soil is too wet to support heavy equipment without unacceptable resource damage as described in the Forest Plan (see Appendix A, BMPs).
10. All skid trails and landings would be designated and approved by Forest Service personnel to meet the Best Management Practices and applicable management requirements before logging and would be located on already disturbed areas where possible. There would be no skidding off designated skid trails.
11. All skid trails, forwarder trails, and landings would be rehabilitated as necessary to reduce soil erosion and compaction (see Appendix E for soil conditions by unit). This may include seeding, waterbarring, subsoiling of landings, etc.
12. Any seeding would use certified weed-free seed. Native grasses and forb seed would be used as available, otherwise non-persistent exotic species would be provided (Standard #13). Hay and straw used for mulch or erosion control would also be weed-free (Standard #3).
13. Gravel, fill, sand stockpiles, quarry sites, and borrow material will be inspected for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists (Standard #7).
14. Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists; incorporate invasive plant prevention practices as appropriate (Standard #8).
15. A copy of known noxious weed infestations and identification material would be included in the timber sale contract package. Known infestations would be treated by the Forest Service prior to implementation of activities according to the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995) and standards outlined in the *Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005*.
16. Purchaser/Contractor shall employ whatever cleaning methods are necessary to ensure that off-road equipment is free of soil, seeds, vegetation matter or other debris that could contain or hold seeds prior to coming onto National Forest lands (Standard #2).
17. Logging haul routes would be maintained before and after use as needed.
18. No hauling over open-water fords unless dry.
19. Where possible a 10 to 15 foot wide strip of regeneration would be left along open and seasonally open roads outside the road prism to reduce big game vulnerability. An exception to this is within Forest Plan areas designated for scenic quality: A4-Viewshed 2 management area (Unit 86).
20. Leave wildlife habitat clumps of uncut regeneration conifers up to 1 acre in size for every 30 acres thinned in the noncommercial thinned units.
21. In noncommercial thin units leave one slash pile per acre for hiding cover for rodents and other wildlife.
22. If a goshawk nest site is located during sale preparation the site would be protected by eliminating harvest on 30 acres of the most suitable nesting habitat around the site and identifying a post fledging area. The 400 acre post fledging area would be designated around this core nest area. This post fledging area would meet guidelines for structural composition as described in Reynolds et al. 1992. Treatment could occur in this post fledging area if treatments retain late and old structure or move young stands toward a late old structure condition.
23. All known cultural resource sites would be protected. Field crews will consult at with the project archaeologist prior to implementation. Any new cultural resource sites discovered during layout or implementation would be protected until an archeologist can assess them and determine appropriate actions.
24. No snags would be cut unless identified as a danger tree or within portions of units 56 and 57 where salvage harvest would occur. Within the salvage portions of Units 56 and 57 four snags per acre would be left; at least two snags greater than 10 inches and two snags greater than 20 inches where available. Where possible snags would be left in clumps.

25. Large down wood would be retained as illustrated in Table 2-1.

Table 2-1 - Down Wood Retention per Acre by Plant Association Group

| Plant Association Group | Pieces per Acre | Diameter at Small End | Length per Piece | Total Length per Acre |
|---|---|---|---|---|
| Ponderosa Pine | 3 | 12 inches | >6 feet | >20 feet |
| Warm grand fir | 15 | 12 inches | >6 feet | >100 feet |

26. Burn prescriptions would be designed to produce low fire intensities. The majority of the burning would take place when heavier fuels and duff moisture contents are high, such as in spring or in late fall, when fuel moistures meet burn plan guidelines. Burning with higher fuel moistures would reduce consumption of fuels greater than 3 inches in diameter to satisfy down wood retention guidelines, and to limit the exposure of mineral soil.

27. Prescribed fire would not be ignited in Riparian Habitat Conservation Areas; however, fire would be allowed to back into Riparian Habitat Conservation Areas and exposure of mineral soil would not exceed 10 percent.

28. Fire control lines adjacent to Riparian Habitat Conservation Areas, on slopes exceeding 35 percent, and on other sensitive areas where soil disturbance is of concern would be constructed by hand. In other areas where fire line is constructed by mechanical means, the fire line would be rehabilitated by constructing waterbars and seeding as necessary.

29. Noncommercial thinning contractors would limb and buck created slash to move fuel closer to the ground level, thus reducing the risk of high intensity wildfire, or the treatment units would be mechanically treated to accomplish fuel treatment.

30. All plowing would meet road maintenance contract specifications for snowplowing and are sited below:

- Snowplowing would occur in a way that prevents erosion damage to roads and streams.
- There would be no side casting of snow into streams.
- No plowing would occur during breakup conditions.
- Equipment is of the size and type commonly used to remove snow and would not cause damage to the road.
- The use of dozers to remove snow requires written Forest Service approval. All equipment shall be equipped with shoes or runners to keep the dozer blade at a minimum of two inches above the road surface unless agreed otherwise.
- Berms shall be opened to prevent the accumulation of runoff during melt off.
- Surface trenches in snow surface may be required to direct high runoff flows into areas, which would allow spreading and absorption of water.

## *Monitoring and Evaluation*

The following are descriptions of monitoring needed to assure the desired outcome of the various projects. Monitoring for both implementation (whether the project was implemented as planned) and effectiveness (whether overall management objectives were met) would occur. Forest Service personnel would conduct monitoring in areas that have the highest probability of showing effects. At a minimum, monitoring will be consistent with the Forest Plan Monitoring Strategy. Monitoring identified as essential will occur if the project is implemented. Other monitoring will be completed as funding permits. An implementation plan will be prepared prior to project implementation that will be used to identify the person(s) responsible for implementation and track project administration and monitoring activities.

## Forest Plan Monitoring

During project lay-out, units would be spot checked by Forest Service personnel to assure that riparian protection, as delineated by PACFISH requirements and Best Management Practices is implemented as stated. Boundaries that do not meet requirements would be adjusted accordingly. This monitoring is considered essential.

Number, size, and distribution of snags and down logs within a sample of units would be field checked by Forest Service personnel. This monitoring is considered essential.

The Forest Service contract representative would monitor during and after activities to ensure sediment and soil compaction objectives are met. If objectives are not met, Forest Service personnel would identify and implement corrective action and document modifications to be used in future projects. This monitoring is considered essential.

The District noxious weed coordinator or crew would conduct noxious weed species surveys prior to initiation of harvest or other ground disturbing activities within the project area. This monitoring is considered essential.

Forest Service personnel would spot check activities during implementation to determine whether noxious weed mitigation measures are implemented. Deviations would be corrected immediately. This monitoring is considered essential.

For five years after activities are completed, the District noxious weed coordinator or crew would conduct an annual inventory of the treatment area and access routes to determine if existing noxious weed populations have spread or if new sites have occurred. This monitoring is considered essential.

After prescribed fire treatments, Forest Service personnel would field check a sample of burn units to determine whether the prescription and mitigation (i.e. mortality, mineral soil exposure, fuel load reductions, etc.) have been met. If objectives or mitigation have not been met, additional burning may be delayed or the fire prescription and procedures adapted to ensure the mitigation is achieved. This monitoring is considered essential.

## Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2-2: Summary of Sunflower Bacon Alternatives

| | Alternative | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Total Thinning Area (acres) | 0 | 3160 | 2285 | 2761 |
| Total # of Treatment Units | 0 | 104 | 83 | 94 |
| Commercial Harvest | | | | |
| Conventional Commercial Thin (acres) | 0 | 2456 | 1604 | 1581 |
| # of Con. Commercial Thin Units | 0 | 78 | 58 | 57 |
| Variable Density Thin (acres) | 0 | 0 | 0 | 476 |
| # of Variable Density Units | 0 | 0 | 0 | 11 |
| Harvest System:<br>Forwarder (acres)<br>Skidder (acres) | - | 709<br>1747 | 591<br>1013 | 647<br>1410 |
| Volume Harvested - Bd. Ft. | 0 | 7,743,000 | 4,934,000 | 6,614,000 |
| Volume Harvested - Ccf | 0 | 14,890 | 9,488 | 12,719 |
| Connected Actions/Mitigation to commercial harvest treatment | | | | |
| Activity fuel reduction – mechanical or burn | 0 | 234 | 243 | 273 |
| Burning Control Lines:<br>Mechanical Line - miles | 0 | 4.3 | 7 | 4.8 |
| Temporary Road Miles | 0 | 4.0 | 2.4 | 3.8 |
| Closed roads opened for haul | | 15.7 | 15.7 | 15.7 |
| Open roads maintained for haul | 0 | 33 | 32 | 33 |
| 2120-070 Road closed (miles) | 0 | 0 | 1.1 | 1.1 |
| Forest Plan Amendment | - | Yes | No | Yes |
| Noncommercial Harvest | | | | |
| Noncommercial Thin (acres) | 0 | 704 | 681 | 704 |
| Number of Treatment Units | 0 | 26 | 25 | 26 |
| Additional noncommercial thinning within commercial units (acres) | 0 | 942 | 681 | 781 |
| Number of Commercial Thin units with follow-up noncommercial thin treatment | 0 | 31 | 24 | 27 |
| Landscape Burning | | | | |
| Total landscape burning acres | 0 | 10,196 | 8,617 | 9,347 |
| Connected Actions to landscape burning | | | | |
| Burning Control Lines:<br>Mechanical line | 0 | 1.2 | 0 | 1.2 |
| Wet or Hand line | 0 | 4.4 | 6.5 | 5.7 |

Table 2-3. Thinning Treatment (Commercial and Precommercial) by Management Area

| Management Area | Alternative 1 (Acres) | Alternative 2 (Acres) | Alternative 3 (Acres) | Alternative 4 (Acres) |
|---|---|---|---|---|
| A4 – Viewshed 2 | 0 | 18 | 18 | 18 |
| C1 – Dedicated Old Growth | 0 | 0 | 0 | 0 |
| C3 – Big Game Winter Range | 0 | 2,106 | 1,236 | 1,712 |
| C4 – Wildlife Habitat | 0 | 0 | 0 | 0 |
| C5 – Riparian (Fish and Wildlife) | 0 | 3 | 3 | 3 |
| C8 – Grass-Tree Mosaic | 0 | 0 | 0 | 0 |
| E1 – Timber and Forage | 0 | 1,033 | 1,028 | 1,028 |
| TOTAL | | 3,160 | 2,285 | 2,761 |

Table 2-4. Prescribed Fire by Management Area

| Management Area | Alternative 1 (Acres) | Alternative 2 (Acres) | Alternative 3 (Acres) | Alternative 4 (Acres) |
|---|---|---|---|---|
| A4 – Viewshed 2 | 0 | 65 | 65 | 65 |
| C1 – Dedicated Old Growth | 0 | 228 | 228 | 228 |
| C3 – Big Game Winter Range | 0 | 7,370 | 5,809 | 6,661 |
| C4 – Wildlife Habitat | 0 | 6 | 6 | 6 |
| C5 – Riparian (Fish and Wildlife) | 0 | 250 | 235 | 250 |
| C8 – Grass-Tree Mosaic | 0 | 0 | 0 | 0 |
| E1 – Timber and Forage | 0 | 2,277 | 2,274 | 2,137 |
| TOTAL | | 10,196 | 8,617 | 9,347 |

## *Comparison Response to Purpose and Need by Alternative*

| Purpose and Need | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| **Forest Density**<br>Based on 13,488 acres of upland forest<br>Reduce stand densities of live trees. | Overstocking at 40% | Overstocking at 18% | Overstocking at 24% | Overstocking at 21% |
| **Forest Structure**<br>Based on 13,488 acres of upland forest<br>Increase the amount of old forest with a predominance of large trees in a single stratum:<br>OFSS desire 15-55%<br>OFMS desire 5-20%<br>SEOC desire 5-20% | OFSS at 9%<br>OFMS at 26%<br>SEOC at 21% | OFSS to 10%<br>OFMS to 25%<br>SEOC to 30% | OFSS to 10%<br>OFMS to 26%<br>SEOC to 26% | OFSS to 10%<br>OFMS to 25%<br>SEOC to 28% |
| **Species Composition**<br>Based on 13,488 acres of upland forest<br>Restore more early seral species.<br>P. pine desire 50-90%<br>D.-fir desire 5-15% | ponderosa pine is at 21 %<br>Douglas-fir is at 37% | ponderosa pine to 37%<br>Douglas-fir to 27% | ponderosa pine to 35%<br>Douglas-fir to 28% | ponderosa pine to 36%<br>Douglas-fir to 27% |

| Purpose and Need | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| **Condition Class –** Based on 14,100 acres of dry upland forest. Reduce risk of losing key ecosystem components in the event of an unwanted wildfire | Cond.Class 1 @ 25%<br>Cond. Class 2 & 3 @ 75% | 2,691 acres shifting 19 % to an improved CC rating.<br>Cond. Class 1 to 44%<br>Cond. Class 2 & 3 to 56% | 1,880 acres shifting 13 % to an improved CC rating.<br>Cond. Class 1 to 38%<br>Cond. Class 2 & 3 to 62% | 2,314 acres shifting 16 % to an improved CC rating.<br>Cond. Class 1 to 41%<br>Cond. Class 2&3 to 59% |

## *Comparison of Effects to Resources by Alternative*

| Resource | No action | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Fuels** | | | | |
| Crown Fire Potential<br>A function of canopy based height (CBH) and canopy bulk density (CBD). | Unchanged under this alternative. | Reduced on 3,160 acres. Crown fire potential is correlated to increasing canopy base height and reducing canopy bulk density. | Reduced on 2,285 acres. Crown fire potential is correlated to increasing canopy base height and reducing canopy bulk density. | Reduced on 2,761 acres. Crown fire potential is correlated to increasing canopy base height and reducing canopy bulk density. |
| Crown Fire Transition | Surface fire line intensities would remain above the critical intensity needed for crown fire transition. | Crown fire transition reduced in treated acres. Stand characteristics modified such that crown fire initiation not likely. | Crown fire transition reduced in treated acres. Stand characteristics modified such that crown fire initiation not likely. | Crown fire transition reduced in treated acres. Stand characteristics modified such that crown fire initiation not likely. |

| Resource | Alternative 1-No Action: existing condition | Alternative 2 - Proposed Action (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| **Wildlife** | | | | |
| Big Game Habitat | | Conversion of 133 acres satisfactory and 577 acres marginal cover<br>Increased vulnerability; most treatment acres | No conversion of satisfactory or marginal cover in C3<br>Increased vulnerability; fewest treatment acres | No conversion of satisfactory cover in C3.<br>Variable density thinning creates clumpy stands on 476 acres of marginal cover<br>Increased vulnerability |
| TES Species | | No effect, no impact on any listed species | Same as 2 | Same as 2 |
| Species of Interest and MIS | | 400 acres of potential goshawk nesting habitat thinned<br>Reduction in snags minor; no adverse effects on pileated White-headed, or Lewis woodpeckers, PCEs, or bats of interest<br>No impact on potential olive-sided flycatcher habitat | 300 acres of potential goshawk nesting habitat thinned<br>Reduction in snags minor; no adverse effects on pileated White-headed, or Lewis woodpeckers, PCEs, or bats of interest<br>No impact on potential olive-sided flycatcher habitat | 347 acres of potential goshawk nesting habitat thinned<br>Reduction in snags minor; no adverse effects on pileated White-headed, or Lewis woodpeckers, PCEs, or bats of interest<br>No impact on potential olive-sided flycatcher habitat |
| Neo-Tropical Migratory Birds | | Dry forest habitat improved on 2,404 ac.<br>Reduce mesic mixed conifer habitat by 52 ac.<br>No adverse effects on riparian shrub or shrub-steppe habitats<br>Improved Aspen habitat in 2 stands | Dry forest habitat improved on 1,593 ac.<br>Reduce mesic mixed conifer habitat by 11 ac.<br>No adverse effects on riparian shrub or shrub-steppe habitats<br>Improved Aspen habitat in 2 stands | Dry forest habitat improved on 2,041 ac.<br>Reduce mesic mixed conifer habitat by 16 ac.<br>No adverse effects on riparian shrub or shrub-steppe habitats<br>Improved Aspen habitat in 2 stands |

| Resource | Alternative 1-No Action: existing condition | Alternative 2 - Proposed Action (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| Late Old Structure | | Move from multi stratum toward single stratum on 854 ac. | Move from multi stratum toward single stratum on 690 ac. | Move from multi stratum toward single stratum on 790 ac. |
| Connectivity Habitat | | 361 ac commercially thinned; would meet Forest Plan standards following treatment-short term effect | 323 ac commercially thinned; would meet Forest Plan standards following treatment-short term effect | 359 ac commercially thinned; would meet Forest Plan standards following treatment-short term effect |
| Dead Wood Habitat | | Effects on snags minor; snag density in >10" group would decrease .1/ac at watershed level. Snag density in >20" would not change<br>Downed wood density changes minimal, based on acres treated (burned) | Effects on snags minor; no change in >10" or >20" snag density<br>Down wood density changes minimal, based on acres treated (burned) | Effects on snags minor; no change in >10" or >20" snag density<br>Down wood density changes minimal, based on acres treated (burned) |

| Resource | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action: (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| Soils | | | | |
| Total detrimental soil disturbance (pre-rehabilitation) | | 393 acres | 252 acres | 346 acres |
| Rehabilitation to meet Forest Plan Standards (units/acres) | 0 | 11/35 | 7/19 | 10/31 |
| Soil Erosion Potential | 254 acre | 397 acre | 346 acre | 380 acre |

| Resource | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| Hydrology | | | | |
| road density (mile rd/sq mile) | 3.00 | 3.13 | 3.08 | 3.11 |
| riparian road density | 5.64 | 5.68 | 5.64 | 5.65 |
| canopy cover in RHCA | | immeasurable reduction | no change | immeasurable reduction |
| Clean Water Act standard | | yes | yes | yes |

*Road density and riparian road density is based on all roads within the project area: including open, seasonal, closed, and temporary roads.*

*Clean Water Act standard for maintaining water quality through the implementation of BMPs (Appendix A). Alternative 3 maintains and improves water quality because of no change in riparian road density, no change in crossings, improves deteriorating road system, and no reduction of riparian canopy.*

| Resource | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action (3160 acres) | Alternative 3 (2285 acres) | Alternative 4 (2761 acres) |
|---|---|---|---|---|
| Fisheries and Aquatic Habitat | | | | |
| | Continued risk of wildfire and large scale insect and disease resulting in loss of stream shade and increase in sediment into stream | Greatest impact to fish<br>NLAA | Least impacts to fish due to no RHCA temp road crossing<br>NLAA | NLAA |
| Temporary road crossing in RHCA | | 4.0 miles<br>3 RHCA crossing, units 74 & 66 | 2.4 miles<br>0 crossings | 3.8 miles<br>1 RHCA crossing, unit 74 |
| Miles of closed roads open<br>Closed roads crossing RHCA | | 16 miles<br>13 crossings | 16 miles<br>13 crossings | 16 miles<br>13 crossings |
| Culverts, based on improvement/reconstruction of 7 miles of road | No long term benefit to low water fords | 2 culverts | 2 culverts | 2 culverts |
| Exposed soil (acres in thinning units, underburn blocks, and temporary roads) | | 1,418 | 1,187 | 1,317 |

| Resource | Existing condition | Alternative 2 – Proposed Action | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Recreation | | | | |
| Dispersed camp sites in/near harvest units | 18 documented sites | 7 | 3 | 3 |
| Dispersed camp sites in/near burn blocks | 18 documented sites | 16 | 15 | 14 |

| Resource | Alternative 1-No Action: Wildfire event | Alternative 2 – Proposed Action | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Air Quality | | | | |
| PM10 particulate matter released from prescribed burning | N/A | 1,132 tons over 5+ years | 966 tons over 5+ years | 1,049 tons over 5+ years |
| PM2.5 particulate matter released from prescribed burning | N/A | 1,091 tons over 5+ years | 930 tons over 5+ years | 1,010 tons over 5+ years |
| Total emissions produced | Smoke from a single wildfire would produce an estimated 4,414 tons over about a two week period. | Burning would produce an estimated 2,223 tons over a 5 year period. | Burning would produce an estimated 1,896 tons over a 5 year period. | Burning would produce an estimated 2,059 tons over a 5 year period. |

| Resource | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Visual Quality | | | | |
| Foreground | | Increase in diversity of form, line, color and texture | Least area treated of action alternatives, same effect as Alt 2 | Change in treatment on 476 acres would decrease diversity of line compared to Alt 2. |
| Middle ground | | Minimal noticeable change in form, line, and texture. Increase in color diversity | Least area treated of action alternatives, same effect as Alt 2 | Change in treatment on 476 acres to decrease diversity of line compared to alt 2 |
| Background | | No noticeable change | No noticeable change | No noticeable change |

| Resource | Alternative 1-No Action: existing condition | Alternative 2 – Proposed Action | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Economic and Social | | | | |
| Predicted Bid Rate $/ccf | 0 | 55.52 | 51.19 | 54.28 |
| Present net value $ | 0 | 278,650 | 137,023 | 223,853 |

# Chapter 3 Environmental Consequences

## INTRODUCTION

This chapter discloses the potential effects of each of the alternatives described in Chapter 2, including the scientific and analytical basis for the comparison of the alternatives. The effects discussions are organized by Specialists Reports and are as follows:



Effects are shown as being direct (occurring at the same time and place as the triggering action), indirect (separate in time and space from the action that caused them), or cumulative (the incremental effect of the project when added to effects from other past, present, and reasonably foreseeable actions). Appendix F contains a list of past, present and reasonably foreseeable future projects that may occur in or near the project area. Each resource specialist considered and included activities relevant to the individual resource in the cumulative effects analysis. Direct, indirect and cumulative effects are described in terms of increases or decreases, intensity, duration, and timing. The discussion of these effects also provides a comparison of the trade-offs associated with each alternative. The scale of the analysis area may be different for each resource. The chapter ends with a discussion of compliance with the Forest Plan, various laws, and executive orders.

# FOREST VEGETATION

This section incorporates by reference the Sunflower Bacon Forest Vegetation Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

## Scope of Analysis

All effects analysis was accomplished at the sub-watershed area scale (Alder-Upper Skookum–170702020802) on National Forest lands consisting of 19,746 acres.

## Species Composition

### *Current Condition*

#### Existing Cover Types

Tree species occur in either pure or mixed stands called forest cover types. Cover types are classified using existing tree composition. Forest cover types are based on a predominance of stocking and are seldom pure – the grand fir type, for example, has a majority (50% or more) of grand fir trees but may also contain Douglas-fir or other tree species.

Table V-1 summarizes the area of existing cover types for the Sunflower Bacon analysis area. It shows that the predominant forest cover type is ponderosa pine (33% of the analysis area has ponderosa pine as the plurality[1] or majority species), followed by Douglas-fir (30%), western juniper (9%), and grand fir (3%).

Table V-1. Existing cover types of the Sunflower Bacon analysis area.

| Code | Cover Type Description | Acres | Percent |
|---|---|---|---|
| ABGR | Forest with grand fir as the majority species | 48 | 0.2 |
| mix-ABGR | Mixed forest with grand fir as the plurality species | 532 | 2.7 |
| PIPO | Forest with ponderosa pine as the majority species | 3621 | 18.3 |
| mix-PIPO | Mixed forest with ponderosa pine as the plurality species | 2811 | 14.2 |
| PSME | Forest with interior Douglas-fir as the majority species | 3096 | 15.7 |
| mix-PSME | Mixed forest with interior Douglas-fir as the plurality species | 2815 | 14.3 |
| LAOC | Forest with western larch as the majority species | 24 | 0.1 |
| mix-LAOC | Mixed forest with western larch as the plurality species | 32 | 0.2 |
| JUOC | Forest with western juniper as the majority species | 1438 | 7.3 |
| mix-JUOC | Mixed forest with western juniper as the plurality species | 249 | 1.3 |
| Grass | Nonforest cover types dominated by grass communities | 956 | 4.8 |
| Shrub | Nonforest cover types dominated by shrub communities | 3887 | 19.7 |

*Sources/Notes: Summarized from the vegetation database (see Powell 2001c). Forest cover types where one tree species comprises a majority (e.g., it has 50% or more of the stocking) are named for that species (Eyre 1980). For polygons where no single species predominates, the cover type is named for the plurality species preceded by "mix" to designate a mixed-species composition. Total of 19,746 acres surveyed. 160 acres of meadow, 25 acres of mixed-other, and 52 acres of private are not included.*

[1] The single tree species that has the greatest number of trees that are not overtopped within the stand.

### HRV Analysis for Dry-Forest Composition

Recent bioregional assessments concluded that dry-forest areas have vegetation conditions that are out-of-balance when compared with the historical (presettlement) situation (Caraher et al. 1992, Hessburg et al. 1999, Lehmkuhl et al. 1994, Quigley and Arbelbide 1997). Because management has suppressed fires over several return intervals (fire cycles), dry sites that were historically dominated by ponderosa pine have changed more than any other forest type over the past 90 years.

Sixty-seven percent of national forest system lands in the Sunflower Bacon project area are forested; eighty-nine percent of national forest system land is “dry uplands” when classified using potential vegetation groups. An historical range of variability analysis for vegetation composition on the dry upland forest Potential Vegetation Groups suggests that the analysis area currently contain too many trees, or too many of the “wrong” kind of trees, to continue to thrive (Powell 2000) (Table V-2).

Table V-2. Historical range of variability analysis for vegetation composition on dry upland forest sites.

| Cover Type | Historical Range (%) | Current Percentage | Interpretation |
|---|---|---|---|
| Ponderosa Pine | 50-90 | 21 | Well below HRV |
| Interior Douglas-fir | 5-15 | 37 | Well above HRV |
| Grand Fir | 1-5 | 11 | Above HRV |
| Grass/Forb | 0-5 | 7 | Above HRV |
| Shrub | 0-5 | 17 | Well above HRV |
| Juniper | 0-5 | 7 | Above HRV |

*Sources/Notes: Current percentages were derived from the vegetation database (see Powell 2001c). Historical ranges are approximate and were inferred from Morgan and Parsons (2000). Note that this information pertains to the “dry upland forest” PVG only; historical ranges and the current percentage values would vary for other PVGs.*

## *Direct and Indirect Effects*

The silvicultural prescriptions in all action alternatives include some form of thinning or other harvest cuts that would have a direct effect on the species makeup of each stand. In all cases early seral species such as ponderosa pine or western larch would be favored, making them the preferred species to leave when considering trees to be thinned. Douglas-fir and, to a lesser extent, grand fir would be more likely to be selected for removal.

This shift would bring species compositions across the landscape more in line with what occurred historically, improving overall stand health in the long term. On an individual stand basis, selecting against certain tree species would create stands of trees whose species mix reflects more seral conditions. Although shade tolerant species would still be present in the stands, they would play a minor role in stand development.

In areas where aspen are growing, the action alternatives would remove encroaching conifer species up to 20.9 inches dbh to return the stand to primarily aspen. Historically, these aspen stands were pure aspen and covered many more acres. Thinning, underburning, and future fencing of these stands would allow aspen to re-establish itself on the landscape.

### Alternative 1

Taking no action in the Sunflower Bacon analysis area would result in species compositions that are different from historical conditions. Species mixes in ponderosa pine communities would continue to be dominated by Douglas-fir. This lessens the chance of pine regeneration as time passes, and would make it difficult for the species to maintain a presence or dominance in stands where it historically was the primary species.

In the absence of regular fire cycles and periodic insect-caused mortality, Douglas-fir and grand fir development would continue, moving the stands even further away from their historical range of variability. The lack of reproduction in the Sunflower Bacon analysis area, especially ponderosa pine reproduction, is a direct result of the dense canopies of the Douglas-fir in-growth.

Aspen stands would continue to decline as conifer encroachment takes over habitat needed for aspen survival. To prevent irreversible loss of the species and habitat from the analysis area we need to reverse the modification of this habitat from conifer establishment back toward pure aspen stands.

### Alternative 2

Thinnings would select for removal shade tolerant, mid-seral species such as Douglas-fir and grand fir, while favoring early-seral species such as ponderosa pine or western larch that have a high resistance to fire, drought, and insects or diseases. Table V-3 summarizes the area of post treatment cover types for the Sunflower Bacon analysis area for Alternative 2.

Table V-3. Species composition changes for Alternative 2

| Cover Type | Existing Conditions Acres | Alt 2 Changed Acres | Total acres after Alternative 2 |
|---|---|---|---|
| mix-ABGR | 532 | -156 | 376 |
| PIPO | 3621 | +647 | 4268 |
| mix-PIPO | 2811 | +150 | 2961 |
| PSME | 3097 | -981 | 2116 |
| mix-PSME | 2815 | +340 | 3155 |

### Alternative 3

Thinnings would select for removal shade tolerant, mid-seral species such as Douglas-fir and grand fir, while favoring early-seral species such as ponderosa pine or western larch that have a high resistance to fire, drought, and insects or diseases. Fuel loading would be lower than at present, reducing the future threat of high-intensity wildfire that would kill most, if not all, of the live trees.

Table V-4 summarizes the area of post treatment cover types for the Sunflower Bacon analysis area for Alternative 3. Of all alternatives, Alternative 3 would have the least effect of moving cover type toward the historical range of variability.

Table V-4. Changed Acres for Species Composition by Alternative

| Cover Type | Existing Conditions Acres | Changed Acres | Total Alternative 3 |
|---|---|---|---|
| mix-ABGR | 532 | -103 | 429 |
| PIPO | 3621 | 550 | 4171 |
| mix-PIPO | 2811 | 9 | 2820 |
| PSME | 3097 | -690 | 2407 |
| mix-PSME | 2815 | 234 | 3049 |

#### Alternative 4

Thinnings would select for removal shade tolerant, mid-seral species such as Douglas-fir and grand fir, while favoring early-seral species such as ponderosa pine or western larch that have a high resistance to fire, drought, and insects or diseases.

Table V-5 summarizes the area of post treatment cover types for the Sunflower Bacon analysis area for Alternative 4. Although grand fir changes a little, the majority of the changes occur in the ponderosa pine and Douglas-fir cover types.

Table V-5. Changed Acres for Species Composition by Alternative

| Cover Type | Existing Conditions Acres | Alt 4 Changed Acres | Total Alt 4 |
|---|---|---|---|
| mix-ABGR | 532 | -128 | 404 |
| PIPO | 3621 | 634 | 4255 |
| mix-PIPO | 2811 | 45 | 2856 |
| PSME | 3097 | -819 | 2278 |
| mix-PSME | 2815 | 268 | 3083 |

### *Cumulative Effects*

The cumulative impact is the impact on the environment which results form the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7).

Specific past, present, and reasonably foreseeable future projects that were considered in the cumulative effects analysis are listed in Appendix F of this Environmental Assessment and the effects of these projects to the forest vegetation composition, structure, and density are described in Chapter 3.

#### Alternative 2

Past harvest that harvested the larger, more-valuable ponderosa pine and left the smaller less-valuable Douglas-fir altered the composition of the forest. As a result of these past harvests, along with fire suppression over the last 90 years, dry forest conditions have deviated from what would historically occur. The existing HRV is the result of past activities, such as timber harvest, planting, thinning, and fire suppression. If the elements of HRV are outside their historical range, it can be attributed to these past activities. The existing conditions along with any present activities (Sunflower Bacon) and future activities (fire suppression) would represent the cumulative effects on forest composition. Comparing Table V-6 to the existing conditions (Table V-2), ponderosa pine, even though it is still below its historical range, increased by 16%, while Douglas-fir, which is still well above HRV, decreased by 10% throughout the entire Sunflower Bacon project area.

Table V-6. Historical range of variability analysis for post-treatment vegetation, Sunflower Bacon project area for Alternative 2

| Cover Type | Historical Range (%) | Alternative 2 % | Interpretation |
|---|---|---|---|
| Ponderosa Pine | 50-90 | 37 | Well Below HRV |
| Interior Douglas-fir | 5-15 | 27 | Well Above HRV |
| Grand Fir | 1-5 | 2 | Within HRV |
| Grass/Forb | 0-5 | 5 | Upper Limits of HRV |
| Shrub | 0-5 | 20 | Well Above HRV |
| Juniper | 0-5 | 9 | Above HRV |
| *Sources/Notes: Current percentages reflect the post-treatment situation. Historical ranges are approximate and were inferred from Morgan and Parsons (2000).* | | | |

Alternative 3

Comparing Table V-7 to the existing conditions (Table V-2), ponderosa pine, even though it is still below its historical range, increased by 14% while Douglas-fir, which is still well above HRV, decreased by 9%.

Table V-7. Historical range of variability analysis for post-treatment vegetation, Sunflower Bacon project area for Alternative 3

| Cover Type | Historical Range (%) | Current Percentage | Interpretation |
|---|---|---|---|
| **Ponderosa** Pine | 50-90 | 35 | Well Below HRV |
| Interior Douglas-fir | 5-15 | 28 | Well Above HRV |
| Grand Fir | 1-5 | 2 | Within HRV |
| Grass/Forb | 0-5 | 5 | Upper Limits of HRV |
| Shrub | 0-5 | 20 | Well Above HRV |
| Juniper | 0-5 | 9 | Above HRV |
| *Sources/Notes: Current percentages reflect the post-treatment situation. Historical ranges are approximate and were inferred from Morgan and Parsons (2000).* | | | |

Alternative 4

Comparing Table V-8 to the existing conditions (Table V-2), ponderosa pine, even though it is still below its historical range, increased by 15%. Douglas-fir, which is still well above HRV, decreased by 10%.

Table V-8. Historical range of variability analysis for post-treatment vegetation, Alternative 4

| Cover Type | Historical Range (%) | Current Percentage | Interpretation |
|---|---|---|---|
| Ponderosa Pine | 50-90 | 36 | Well Below HRV |
| Interior Douglas-fir | 5-15 | 27 | Well Above HRV |
| Grand Fir | 1-5 | 2 | Within HRV |
| Grass/Forb | 0-5 | 5 | Upper Limits of HRV |
| Shrub | 0-5 | 20 | Well Above HRV |
| Juniper | 0-5 | 9 | Above HRV |
| *Sources/Notes: Current percentages reflect the post-treatment situation. Historical ranges are approximate and were inferred from Morgan and Parsons (2000).* | | | |

## Forest Structure

### *Current Condition*

When considering both the historical and recent harvest activity, much of the project area has experienced some type of timber harvest. With the exception of one timber sale, the majority of these harvests did not create openings or leave an understocked stand, so there was very little need for artificial regeneration following harvest. In many instances, overstory trees were removed across large areas, which left a residual understory comprised mostly of small-diameter Douglas-fir trees along with incidental amounts of large overstory ponderosa pine.

Typical stands in the Sunflower Bacon project area contains 0.5 to 3 large overstory ponderosa pines per acre with an understory stand of co-dominate Douglas-fir. The majority of these stands would be classified as either stem exclusion open canopy or stem exclusion closed canopy. In these classes, establishment of new trees is precluded by lack of sunlight or by a lack of moisture.

Oliver and Larson (1996) recently developed a system to classify forest structure; their approach utilized four process-oriented developmental stages. Although Oliver and Larson's (1996) classification works well for coniferous forests located west of the Cascade Mountains in Oregon and Washington, certain conditions in the interior Pacific Northwest are incompatible with their four-stage system. Consequently, it was expanded to 7 classes to include a wider spectrum of structural variation (O'Hara et al. 1996).

Table V-9 summarizes the area of forest structural classes, using the 7-class system described by O'Hara et al. (1996), for the Sunflower Bacon analysis area. It shows that the predominant structural stage is stem exclusion closed canopy, followed by the old forest multi-strata and stem exclusion open canopy structural stages. Understory reinitiating, stand initiation and young forest multi-strata are relatively uncommon structural classes – each of them occupies four percent or less of the Sunflower Bacon analysis area.

Table V-9. Existing forest structural classes for the Sunflower Bacon analysis area.

| Code | Forest Structural Class Description | Acres | Percent |
|---|---|---|---|
| OFMS | Old Forest Multi Strata structural class | 3562 | 18.0 |
| OFSS | Old Forest Single Stratum structural class | 1221 | 6.2 |
| SECC | Stem Exclusion Closed Canopy structural class | 3998 | 20.2 |
| SEOC | Stem Exclusion Open Canopy structural class | 2807 | 14.2 |
| SI | Stand Initiation structural class | 836 | 4.2 |
| UR | Understory Reinitiation structural class | 419 | 2.1 |
| YFMS | Young Forest Multi Strata structural class | 646 | 3.3 |
| Nonforest | Forbland, grassland, and shrubland cover types | 4833 | 24.5 |
| Woodland | Woodland (western juniper) structural classes | 1372 | 6.9 |
| *Sources/Notes: Acreage figures include NFS lands only. Forest structural classes are described in O'Hara et al. (1996) and in Powell (2000). Total of 19,746 acres surveyed. 52 acres of private not included.* | | | |

### HRV Analysis for Forest Structural Classes

To understand the implications of current conditions, it is often helpful to put them in an historical context. An historical range of variability analysis was used to evaluate structural classes for the Sunflower Bacon analysis area; results are provided in Table V-10. It summarizes the current percentage of each structural class compared to the historical ranges for each of the structural classes.

The Historical Range of Variability results in Table V-10 shows that one dry-forest structural class is below the historical range (old forest single stratum), and that three structural classes are above the historical range (stem exclusion open canopy, stem exclusion closed canopy, and old forest multi-strata). Note that the Historical Range of Variability was not interpreted for the moist upland forest potential vegetation group, due to its limited acreage within the analysis area.

Table V-10. Current Historical Range of Variability (HRV) analysis for forest structural classes in the Sunflower Bacon project area

| | | FOREST STRUCTURAL CLASSES | | | | | | | NFS ACRES |
|---|---|---|---|---|---|---|---|---|---|
| | | SI | SEOC | SECC | UR | YFMS | OFMS | OFSS | |
| | H% | 5-15 | 5-20 | 1-10 | 1-10 | 5-25 | 5-20 | 15-55 | 13,488 |
| | C% | 6 | 21 | 30 | 3 | 5 | 26 | 9 | |
| *Sources/Notes: Summarized from the vegetation database (see Powell 2001c). Upland forest potential vegetation groups (PVG) are described in Powell (1998). Historical percentages (H%) were derived form Hall (1993), and USDA Forest Service (1995), and are summarized in Blackwood (1998). Current percentage (C%) were based on NFS lands. Structural class codes are described in Table V-9. Gray cells show instances where the current percentages (C%) is above the historical percentage (H%) for a structural class. Black cells show instances where the current percentage is below the historical percentage. Moist UF was combined with Dry UF due to there being only 238 acres in Moist UF. Non-Forest and Woodlands acres are not included in HRV Analysis.* | | | | | | | | | |

## *Direct and Indirect Effects*

All action alternatives would be focused primarily upon increasing old forest single stratum, which is well below its historic range of variability in the Sunflower Bacon analysis area. Thinning from below, removing the smaller trees and leaving the larger trees, would be the primary means of achieving this goal, especially in the stem exclusion closed canopy and old forest multi strata. Thinning the stands would reduce the number of trees, allowing the remaining trees to grow larger more quickly. Research shows that growth rates in ponderosa pine, western larch and grand fir are greater following thinning (Cochran et al., 1999; 1998; and Seidel, 1983). Some stands in the action alternatives would be treated to immediately minimize the current impacts and future risk of insects and disease. The effect of this treatment would be to shift their current structure of stem exclusion closed canopy to a more open condition resembling old forest single stratum.

Thinning in stem exclusion open canopy, which is at the high end of the historical range of variability, would not alter the current structural stage, but it would enhance growing conditions for individual trees within the stands so that they may obtain old forest single-strata sooner. Generally, thinning in stand initiation, understory reinitiation and young forest multi strata does not change the structural stage, however, it does lessen the risk of insect, disease and stand replacement fires and allows old forest characteristics to develop sooner by freeing more growing space for the larger trees in the stand.

A direct effect of the prescribed fire would be the elimination of smaller reproduction to aid in reducing stand densities and eliminating ladder fuels. An indirect effect of the prescribed fire in the short term would be the weakening of some of the larger trees causing an increase in the susceptibility to some insects and diseases. In the long term, these trees would either survive as overstory trees or die, creating additional snags.

#### Alternative 1

No action in the analysis area would leave the current stand structures as they are. In the case of Old Forest Single Stratum, active management would be the only foreseeable avenue for promoting an increase in this structural stage. In the absence of future stand-initiating disturbance events, forest stands would eventually come to be dominated by late-successional Douglas-fir and grand fir. Many forest stands in the proposed treatment areas are already exhibiting these compositional changes.

The Forest Vegetation Simulator growth and yield model predicted future structural classes for Douglas-fir/elk sedge and Douglas-fir/snowberry plant associations. The model predicted future stand structure with no treatment in the Douglas-fir/elk sedge plant association units to result in stands that would never reach old forest structure (OFSS or OFMS) because the trees would be too dense and would never put on enough diameter growth to reach the larger diameters to qualify for old forest structure. With no treatment the Douglas-fir/snowberry plant association units the stands would never reach old forest single-stratum, however many of the stands would reach old forest multi-strata.

The Forest Vegetation Simulator growth and yield model was used to predict future structural class for Douglas-fir/elk sedge and Douglas-fir/snowberry plant associations, two of the most prevalent plant associations in the Sunflower Bacon project area. With thinning and underburning treatments in the Douglas-fir/elk sedge plant association units, some treated stands reach old forest structure in 10 years. All stands treated reach old forest structure in 60 years.

In the Douglas-fir / snowberry plant association units the results are mixed. With the thinning and underburning treatment the majority of the stands would reach old forest structure (mostly OFSS with some OFMS) and remain that way. Only two of the stands modeled would not reach diameters large enough to qualify for old forest structure within the next 100 years.

#### Alternative 2

Alternative 2 would have the greatest influence on structure in the Sunflower Bacon analysis area. Post structure Old Forest Single Stratum would be the same as in other alternatives, but Stem Exclusion Open Canopy would increase more than with any other alternative. Stem Exclusion Open Canopy mimics Old Forest Single Stratum in that it creates the park-like stands, but is made up of smaller diameter trees.

Table V-11 summarizes the area of forest structural classes for Alternative 2 for the Sunflower Bacon analysis area. It shows that the predominant structural class after harvest would be stem exclusion open canopy, followed by old forest multi strata and stem exclusion closed canopy. Note also that old forest single stratum increased by 0.7% from the existing conditions (Table V-9)

Table V-11. Post-treatment forest structural classes for the Sunflower Bacon analysis area for Alternative 2.

| Code | Forest Structural Class Description | Acres | Percent |
|---|---|---|---|
| OFMS | Old Forest Multi Strata structural class | 3406 | 17.2 |
| OFSS | Old Forest Single Stratum structural class | 1366 | 6.9 |
| SECC | Stem Exclusion Closed Canopy structural class | 2750 | 13.9 |
| SEOC | Stem Exclusion Open Canopy structural class | 4055 | 20.5 |
| SI | Stand Initiation structural class | 836 | 4.2 |
| UR | Understory Reinitiation structural class | 419 | 2.1 |
| YFMS | Young Forest Multi Strata structural class | 656 | 3.3 |
| Nonforest | Forbland, grassland, and shrubland cover types | 4835 | 24.5 |
| Woodland | Woodland (western juniper) structural classes | 1372 | 6.9 |

*Sources/Notes: Acreage figures include NFS lands only. Forest structural classes are described in O'Hara and others (1996) and in Powell (2000; see table 2, page 16). Total acres surveyed 19,746. 52 acres of private not included.*

### Alternative 3

Alternative 3 would have the least influence on structure in the Sunflower Bacon analysis area. Post structure Old Forest Single Stratum would be the same as in other alternatives, but Stem Exclusion Open Canopy would be about equal to Stem Exclusion Closed Canopy.

Table V-12 summarizes the area of forest structural classes for Alternative 3 in the Sunflower Bacon analysis area. It shows that the predominant structural class after harvest would be stem exclusion open canopy, followed by old forest multi strata and stem exclusion closed canopy. Note also that old forest single stratum increased by 0.3% from the existing conditions (Table V-9). Of all alternatives, Alternative 3 would have the least effect on forest structure after harvest, based on the number of acres treated.

Table V-12. Post-treatment forest structural classes for Alternative 3.

| Code | Forest Structural Class Description | Acres | Percent |
|---|---|---|---|
| OFMS | Old Forest Multi Strata structural class | 3489 | 17.7 |
| OFSS | Old Forest Single Stratum structural class | 1283 | 6.5 |
| SECC | Stem Exclusion Closed Canopy structural class | 3275 | 16.6 |
| SEOC | Stem Exclusion Open Canopy structural class | 3530 | 17.9 |
| SI | Stand Initiation structural class | 836 | 4.2 |
| UR | Understory Reinitiation structural class | 419 | 2.1 |
| YFMS | Young Forest Multi Strata structural class | 656 | 3.3 |
| Nonforest | Forbland, grassland, and shrubland cover types | 4835 | 24.5 |
| Woodland | Woodland (western juniper) structural classes | 1703 | 8.7 |
| *Sources/Notes: Acreage figures include NFS lands only. Forest structural classes are described in O'Hara and others (1996) and in Powell (2000; see table 2, page 16). Total acres surveyed 19,746. 52 acres of private not included.* | | | |

### Alternative 4

Alternative 4 would have a moderate influence on structure in the Sunflower Bacon analysis area. Post structure Old Forest Single Stratum would be the same as in other alternatives, but Stem Exclusion Open Canopy would increase 4 % over Stem Exclusion Closed Canopy.

Table V-13 summarizes the area of forest structural classes for Alternative 4 for the Sunflower Bacon analysis area. It shows that the predominant structural class after harvest would be stem exclusion open canopy, followed by old forest multi strata and stem exclusion closed canopy. Note also that old forest single stratum increased by 0.6% from the existing conditions (Table V-9).

Table V-13. Post-treatment forest structural classes for Alternative 4.

| Code | Forest Structural Class Description | Acres | Percent |
|---|---|---|---|
| OFMS | Old Forest Multi Strata structural class | 3424 | 17.3 |
| OFSS | Old Forest Single Stratum structural class | 1348 | 6.8 |
| SECC | Stem Exclusion Closed Canopy structural class | 2976 | 15.1 |
| SEOC | Stem Exclusion Open Canopy structural class | 3829 | 19.4 |
| SI | Stand Initiation structural class | 836 | 4.2 |
| UR | Understory Reinitiation structural class | 419 | 2.1 |
| YFMS | Young Forest Multi Strata structural class | 656 | 3.3 |
| Nonforest | Forbland, grassland, and shrubland cover types | 4835 | 24.5 |
| Woodland | Woodland (western juniper) structural classes | 1372 | 6.9 |
| *Sources/Notes: Acreage figures include NFS lands only. Forest structural classes are described in O'Hara and others (1996) and in Powell (2000; see table 2, page 16). Total acres surveyed 19,746. 52 acres of private not included.* | | | |

## *Cumulative Effects*

The historical range of variability defines conditions that change over time as they are affected by disturbance processes. Historical range of variability is designed to characterize the range of vegetation composition and structure resulting from those agents of change (Morgan et. al. 1994). The existing structural condition is the result of past activities, such as timber harvest, planting, thinning, and fire suppression. The existing conditions that currently exist in the Sunflower Bacon project area are a result of past activities. The existing conditions, along with any present activities (Sunflower Bacon) and future activities (fire suppression), would represent the cumulative effects on forest structure.

### Alternative 2

Table V-14 denotes the change in the Historical Range of Variability in percentages after harvest of Alternative 2 from existing conditions. Old Forest Single Strata increases by 1% from the existing conditions, Stem Exclusion Open Canopy increases by 9 % and Stem Exclusion Closed Canopy decreases by 9 %. This outcome responds favorably to the dry-forest issues already identified, namely increasing ponderosa pine forest, decreasing Douglas-fir forest, an overabundance of multi-layer forest and a deficiency of single-layer forest. (Refer to Table V-10 for existing conditions)

Table V-14. Historical range of variability (HRV) analysis for Alternative 2 for forest structural classes.

| | | FOREST STRUCTURAL CLASSES | | | | | | | NFS ACRES |
|---|---|---|---|---|---|---|---|---|---|
| | | SI | SEOC | SECC | UR | YFMS | OFMS | OFSS | |
| | H% | 5-15 | 5-20 | 1-10 | 1-10 | 5-25 | 5-20 | 15-55 | 13,488 |
| | Alt. 2% | 6 | 30 | 21 | 3 | 5 | 25 | 10 | |

*Sources/Notes: Summarized from the vegetation database (see Powell 2001c). Upland forest potential vegetation groups (PVG) are described in Powell (1998). Historical percentages (H%) were derived form Hall (1993), and USDA Forest Service (1995), and are summarized in Blackwood (1998). Current percentages (C%) were based on NFS lands. Structural class codes are described in Table V-9. Gray cells show instances where the current percentages (C%) is above the historical percentage (H%) for a structural class. Black cells show instances where the current percentage is below the historical percentage. Moist UF was combined with Dry UF due to there being only 238 acres in Moist UF.*

### Alternative 3

Table V-15 denotes the change in percentages after harvest of Alternative 3 from existing conditions. Old Forest Single Strata increases by 1% from the current conditions, Stem Exclusion Open Canopy increases by 5 % and Stem Exclusion Closed Canopy decreases by 6 %. This outcome responds favorably to the dry-forest issues already identified, namely increasing ponderosa pine forest, decreasing Douglas-fir forest, an overabundance of multi-layer forest and a deficiency of single-layer forest (refer to Table V-10 for existing conditions).

Table V-15. Historical range of variability (HRV) analysis for Alternative 3 for forest structural classes.

| | | FOREST STRUCTURAL CLASSES | | | | | | | NFS ACRES |
|---|---|---|---|---|---|---|---|---|---|
| | | SI | SEOC | SECC | UR | YFMS | OFMS | OFSS | |
| | H% | 5-15 | 5-20 | 1-10 | 1-10 | 5-25 | 5-20 | 15-55 | 13,488 |
| | Alt 3 % | 6 | 26 | 24 | 3 | 5 | 26 | 10 | |

*Sources/Notes: Summarized from the vegetation database (see Powell 2001c). Upland forest potential vegetation groups (PVG) are described in Powell (1998). Historical percentages (H%) were derived form Hall (1993), and USDA Forest Service (1995), and are summarized in Blackwood (1998). Current percentages (Alt 3%) were based on NFS lands. Structural class codes are described in Table V-10. Gray cells show instances where the current percentages (Alt 3%) are above the historical percentage (H%) for a structural class. Black cells show instances where the current percentage is below the historical percentage. Moist UF was combined with Dry UF due to there being only 238 acres in Moist UF.*

### Alternative 4

Table V-16 denotes the change in percentages after harvest of Alternative 4 from existing conditions. Old Forest Single Strata increases by 1% from the existing conditions, Stem Exclusion Open Canopy increases by 7 % and Stem Exclusion forest issues identified in Chapter 3, namely increasing ponderosa pine forest, decreasing Douglas-fir forest, an overabundance of multi-layer forest and a deficiency of single-layer forest.

Table V-16. Historical range of variability (HRV) analysis for Alternative 4 for forest structural classes.

| | | FOREST STRUCTURAL CLASSES | | | | | | | NFS ACRES |
|---|---|---|---|---|---|---|---|---|---|
| | | SI | SEOC | SECC | UR | YFMS | OFMS | OFSS | |
| | H% | 5-15 | 5-20 | 1-10 | 1-10 | 5-25 | 5-20 | 15-55 | 13,488 |
| | Alt. 4% | 6 | 28 | 22 | 3 | 5 | 25 | 10 | |

*Sources/Notes: Summarized from the vegetation database (see Powell 2001c). Upland forest potential vegetation groups (PVG) are described in Powell (1998). Historical percentages (H%) were derived form Hall (1993), and USDA Forest Service (1995), and are summarized in Blackwood (1998). Current percentages (C%) were based on NFS lands. Structural class codes are described in Table V-9. Gray cells show instances where the current percentages (C%) is above the historical percentage (H%) for a structural class. Black cells show instances where the current percentage is below the historical percentage. Moist UF was combined with Dry UF due to there being only 238 acres in Moist UF. Closed Canopy decreases by 8 %.*

# Forest Density

## *Current Condition*

With the natural pattern of fire having been altered over the last 90 years, shade tolerant species such as Douglas-fir and grand fir have proliferated within the Sunflower Bacon project area. The upper stand density for the Sunflower Bacon project area currently averages about 135 square feet of basal area per acre, although some areas have tree density in excess of 180 square feet of basal area per acre. This means the overstocked stands in the project area have forest density levels that exceed recommended stocking by a factor of two or three times (Powell 1999).

The term stand density is a measure of the amount of tree vegetation on a unit of land area. It can be expressed as the amount of basal area, wood volume or any variety of other parameters. Stand density tells us what actually exists, whereas stocking tells us how it relates to an established standard of what ought to be. (Smith et al. 1997, Powell 1999)

Recently developed stocking guidelines (Cochran et al. 1994, Powell 1999) were used to analyze forest density levels to infer whether they are ecologically sustainable. By using the stocking guidelines in conjunction with potential vegetation (potential vegetation groups), it was possible to determine the acres that would be considered overstocked.

Overstocked forests have density levels in a self thinning zone where trees aggressively compete for moisture, sunlight, and nutrients. Forests in the self-thinning zone experience mortality as crowded trees die from competition or are killed by insects or diseases that attack trees under stress (Powell 1999).

### Forest Density Analysis

A forest density analysis was completed because it can help identify opportunities to use thinning and other density management treatments to address forest health issues in the Sunflower Bacon project area. The density analysis was based on a process described in Powell (2001b). Results of the forest density analysis were used to identify individual stands that were overstocked. These stands were considered for treatment under the Sunflower Bacon Environmental Analysis (EA). Results of the forest density analysis are summarized in Table V-17. It shows that a moderate percentage of the upland forest in the Sunflower Bacon analysis area is overstocked (40 percent).

Table V-17: Forest density analysis for the Sunflower Bacon analysis area.

| Potential Vegetation Group | Total Acres | Not Overstocked (Acres) | Overstocked (Acres) | Overstocked (Percent) |
|---|---|---|---|---|
| Dry Upland Forest | 13,254 | 8222 | 5193 | 39% |
| Moist Upland Forest | 238 | 29 | 209 | 88% |
| Total (Upland Forest) | 13,492 | 8251 | 5,402 | 40% |

*Sources/Notes: Summarized from the vegetation database (see Powell 2001c). Criteria used for determination of stocking status ("overstocked" or "not overstocked") are described in Powell (2001b). Overstocked refers to forestland with more trees than normal or that full stocking would require. In an overstocked stand, tree density is so high that intense inter-tree competition is occurring and large trees are taking growing space away from small trees in a process called self-thinning.*

## *Direct and Indirect Effects*

All action alternatives would thin existing stands to recommended stocking levels for each plant association leaving the largest, most vigorous trees. The existing stands would benefit from a thinning treatment that thins from below removing small-diameter understory trees, thereby reducing competition for sunlight, moisture and nutrients. Reduced competition results in higher tree vigor and lower susceptibility to insects and pathogens that seek out stressed trees.

Stand density index shows that even after a silvicultural treatment (thinning), stand density index are still above recommended levels. Only after a prescribed underburn is performed does stand density index approach recommended levels.

### Alternative 1

The Sunflower Bacon project area would continue to be overstocked at 40% and would remain overstocked in the future. The stands identified as overstocked would continue to self-thin as described in the current condition section.

### Alternative 2

Thinning treatments would diminish future tree mortality associated with insect and disease agents, reduce future susceptibility to uncharacteristic wildfire intensity, and leave stands in a more vigorous condition by:

- Discriminating against tree species that are hosts of tussock moth and budworm, thereby restoring a more appropriate species composition and structure.
- Reducing forest (tree) density to levels that are below the threshold of imminent susceptibility to bark beetle attack.
- Removing trees infected with dwarf mistletoe and other parasites or diseases.
- Thinning around large-diameter trees, thereby improving their health and vigor and contributing to their increased longevity.
- Favoring retention of disease-resistant tree species, particularly within areas experiencing on-going forest health problems.
- Permitting reintroduction of low-intensity surface fire with its many associated ecosystem benefits.

Implementing thinning, in conjunction with future reintroduction of low-intensity prescribed fire at regular intervals, would do much to reverse this departure from historical composition and structure. Thinnings also respond favorably to the following broad-scale trends identified in a scientific assessment for the interior Columbia River Basin: substantial declines in single-layer old forest structure; increased structural complexity in the absence of native disturbance regimes; increased stand density and forest stocking; increased homogeneity in both forest composition and structure; and substantial increases in the amount of lethal fires (Quigley et al. 1996).

Alternative 2 would reduce stocking on 3,025 acres in the Sunflower Bacon project area to levels recommended in stocking guidelines identified in *Suggested Stocking Levels for Forest Stands in Northeastern Oregon and Southeastern Washington: An Implementation Guide for the Umatilla National Forest* (Powell 1999) referred to as *Suggested Stocking for the Umatilla NF* in the remainder of this document.

Table V-18: Forest density analysis for post-treatment conditions, Sunflower Bacon analysis area.

| Potential Vegetation Group | Acres treated to recommended stocking level |
|---|---|
| Dry Upland Forest | 2,997 |
| Moist Upland Forest | 28 |
| Total (Upland Forest) | 3,025 |

### Alternative 3

Alternative 3 would reduce stocking on 2,183 acres in the Sunflower Bacon project area to levels recommended in *Suggested Stocking for the Umatilla NF*.

Table V-19: Forest density analysis for post-treatment conditions

| Potential Vegetation Group | Acres treated to recommended stocking level |
|---|---|
| Dry Upland Forest | 2,172 |
| Moist Upland Forest | 11 |
| Total (Upland Forest) | 2,183 |

### Alternative 4

Alternative 4 would reduce stocking on 2,659 acres in the Sunflower Bacon project area to levels recommended in *Suggested Stocking for the Umatilla NF*.

Table V-20: Forest density analysis for post-treatment conditions, Alternative 4

| Potential Vegetation Group | Acres treated to recommended stocking level |
|---|---|
| Dry Upland Forest | 2,644 |
| Moist Upland Forest | 15 |
| Total (Upland Forest) | 2,659 |

## *Cumulative Effects*

Past activities, such as fire suppression and timber harvest, both even-aged and uneven-aged, affected the current stocking densities observed in stands within the analysis area. Past management activities have had a big impact on the upland forest vegetation in the Sunflower Bacon analysis area. Timber sales have had an impact on stand density. According to Heppner Ranger District records, the earliest timber harvest in the Sunflower Bacon area occurred in 1948 and the most recent in 1995. The Keeney

Timber Sale in the early 1980s had the biggest impact of any single sale with approximately 5,355 acres of shelterwood and seed tree harvest.

Planting and natural regeneration followed most of the shelterwood, seed tree, and clearcut harvests. Approximately 537 acres have been successfully regenerated in the analysis area. Regeneration of those units returned the units to a fully stocked condition. Many of the stands regenerated in the 1980s and early 1990s are stands now identified as stands where noncommercial thinning would occur. The remaining 4,651 acres outside the area designated for noncommercial thinning for the Sunflower Bacon EA are either: (1) at or slightly above suggested stocking levels, excluding them from harvest at this time; or (2) associated with riparian habitat conservation areas that have been designated by PACFISH several years after the Keeney Timber Sale was harvested.

Noncommercial thinning has taken place on approximately 2,257 acres within the analysis area. Noncommercial thinning of those acres has had the effect of reducing stand density to recommended levels.

Fire suppression over the past century has also had a big impact on stand density by extending the historical fire regime of frequent, low intensity fires. With the exclusion of fires over the past century, dense stands have developed over much of the upland forest area.

Other future activities include grazing, which would continue at present levels, and fire suppression, which would allow reproduction of shade tolerant species, resulting in a future increase in stand density.

Other future activities that are ongoing would include activities such as livestock grazing, firewood cutting, fire suppression, monitoring, and road maintenance. Modeling stand growth using Forest Vegetation Stand Simulator (FVS) indicates fire suppression would have the greatest impact on stand density. For the stands that are thinned and underburned, modeling indicates that most of the stands will reach an overstocked condition within 50 to 100 years without further management activities, other than fire suppression.

#### Alternative 2

Alternative 2 would reduce areas identified as overstocked in the Sunflower Bacon analysis area from 40% to 17%.

| Potential Vegetation Group | Total Acres | Overstocked Acres | Percent Overstocked |
|---|---|---|---|
| Dry Upland Forest | 13,254 | 2196 | 17% |
| Moist Upland Forest | 238 | 181 | 76% |
| Total (Upland Forest) | 13,492 | 2377 | 18% |

### Alternative 3

Alternative 3 would reduce areas identified as overstocked in the Sunflower Bacon analysis area from 40% to 24%.

| Potential Vegetation Group | Total Acres | Overstocked Acres | Percent Overstocked |
|---|---|---|---|
| Dry Upland Forest | 13,254 | 3021 | 23% |
| Moist Upland Forest | 238 | 222 | 93% |
| Total (Upland Forest) | 13,492 | 3243 | 24% |

### Alternative 4

Alternative 4 would reduce areas identified as overstocked in the Sunflower Bacon analysis area from 40% to 20%.

| Potential Vegetation Group | Total Acres | Overstocked Acres | Percent Overstocked |
|---|---|---|---|
| Dry Upland Forest | 13,254 | 2549 | 19% |
| Moist Upland Forest | 238 | 218 | 92% |
| Total (Upland Forest) | 13,492 | 2767 | 21% |

# *FIRE/FUELS*

This section incorporates by reference the Sunflower Bacon Fire/Fuels Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

## Scope of the Analysis

This analysis was conducted at the sub-watershed area scale (Alder-Upper Skookum-170702020802) on National Forest Lands. Condition class was analyzed using the dry and moist upland forest, consisting of 14,100 acres. Fire regime was analyzed on the subwatershed scale, consisting of 19,746 acres. Fire occurrence and fuels information on the private property was not available and therefore is not included in the analysis.

## Current Conditions

The Sunflower Bacon Project Area is a fire dependent ecosystem where fire once played a natural role in shaping and maintaining the landscape of the area. The Wall Watershed Analysis defines the area as one of many watersheds in eastern Oregon where fire exclusion and forest management over the past 90 years has resulted in some significant changes in forest species and structure (Gast 1991, Johnson et al 1994). Historic stands could be characterized as open, large structure stands that were maintained by frequent low intensity fires. In the Blue Mountains, Hall (1976) found a 10 year fire return interval using single stump samples (Agee, 1993).

In the absence of fire, many of the upland forest stands now differ from their historical structure, size, and species composition, resulting in diminished ecosystem diversity, health, resiliency, and fueling conditions for unnaturally intense fires with uncharacteristic effects and severity.

Vertical (ladder fuels) and horizontal (dead and down) fuel loadings have increased across the project area primarily from fire exclusion and insect outbreaks. Expected fire effects in the analysis area with the current stand density, multi layered canopies and current fuel loadings, would not be consistent with the effects of fire regimes 1[2] and 3a[3].

## Fire Regime Condition Class

### *Current Condition*

#### Fire Regimes

The Sunflower Bacon project area is primarily that of a Fire Regime 1, where natural fire returned frequently between 0-35 years, as a low intensity surface fire. Fire size was variable in this fire regime and ranged from 47 – 19,959 acres with a mean fire size of 2,953 (Heyerdahl and Agee 1996, Heyerdahl 1997). Fire Regime 1 represents the dry upland forest types such as the ponderosa pine and Douglas-fir plant associations and makes up 71% of the Sunflower Bacon project area. Current fire effects within Fire Regime 1 could be characterized as mixed severity to stand replacement. Fires today would not be low intensity surface fires, but would be intense surface fires with potential to become crown fires.

Vegetative conditions within the upland forests are not conducive to low intensity surface fires. Of all eastside forest, dry forest has changed the most. In old or mature (late seral) ponderosa pine forest, multi layered, mixed conifer understories are now more widespread than historically. Tree densities are much higher, and the mix of dominate tree species changed in many places (USDA 2002). These conditions increase the probability of surface fires developing into crown fires, because understory ladder fuels lower the effective canopy base height. This departure from historical conditions is common in high-frequency, low-to-moderate-severity fire regimes (Agee et al. 1991).

In Fire Regime 2, fires also returned on a 0-35 year cycle, however fires were much more severe, high intensity, with overstories suffering greater than 75% mortality. This fire regime represents the grass and shrubland component of the project area. The acres in Fire Regime 2 make up 21% of the project area and are within their natural HRV and were not analyzed in this project.

Fire Regime 3 has a fire return interval of 35-100 + years with mixed severity. This fire regime usually results in heterogeneous landscapes. Large, high severity fires may occur but are usually rare events. Subsets of Fire Regime 3 exist based on return interval for this analysis. Subset Fire Regime 3a was used in this analysis and exists in 8% of the analysis area. The fire return interval for fire regime 3a

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*[2] 0-35 years, Low severity.*

*Typical climax plant communities include ponderosa pine, eastside/dry Douglas-fir, pine-oak woodlands, Jeffery pine on serpentine soils, oak woodlands, and very dry white fir. Large stand-replacing fire can occur under certain weather conditions, but are rare events (i.e. every 200+ years).*

*[3] < 50 years, Mixed Severity*

*Typical potential plant communities include mixed conifer, very dry westside Douglas-fir, and dry grand fir. Lower severity fire tends to predominate in many events.*

generally occurs < 50 years with mixed severity. Severity of a wildfire today within this fire regime would have uncharacteristic effects. Increased fuel loading along with increased stocking levels would contribute to fire effects that can be characterized as more stand replacement than mixed severity.

In the Sunflower Bacon Project Area the natural fire regimes are shown in Table F-1. Fire regimes 1 and 3a make up 79% of the project area. These fire regimes are where low intensity surface fires dominated the landscape historically. These natural fire regimes and fire return intervals still exist today. The effects and severity of wildfires today would not be characteristic of the low intensity fire regimes represented within the analysis area.

Table F-1. Fire Regimes in Sunflower Bacon Project Area

| Fire Regime Group | Fire Frequency | Fire Severity | Plant Association Group | Acres | Percentage of analysis area. |
|---|---|---|---|---|---|
| Fire Regime 1 | 0 – 35 years | Low | Ponderosa Pine/Dry Douglas-fir | 14,100 | 71% |
| Fire Regime 2 | 0 – 35 years | Stand Replacement | Grass Shrublands | 4,196 | 21% |
| Fire Regime 3a | < 50 years | Mixed severity | Mixed conifer dry | 1,398 | 8% |

** 52 acres of Private land not included in the fire regime mapping.*

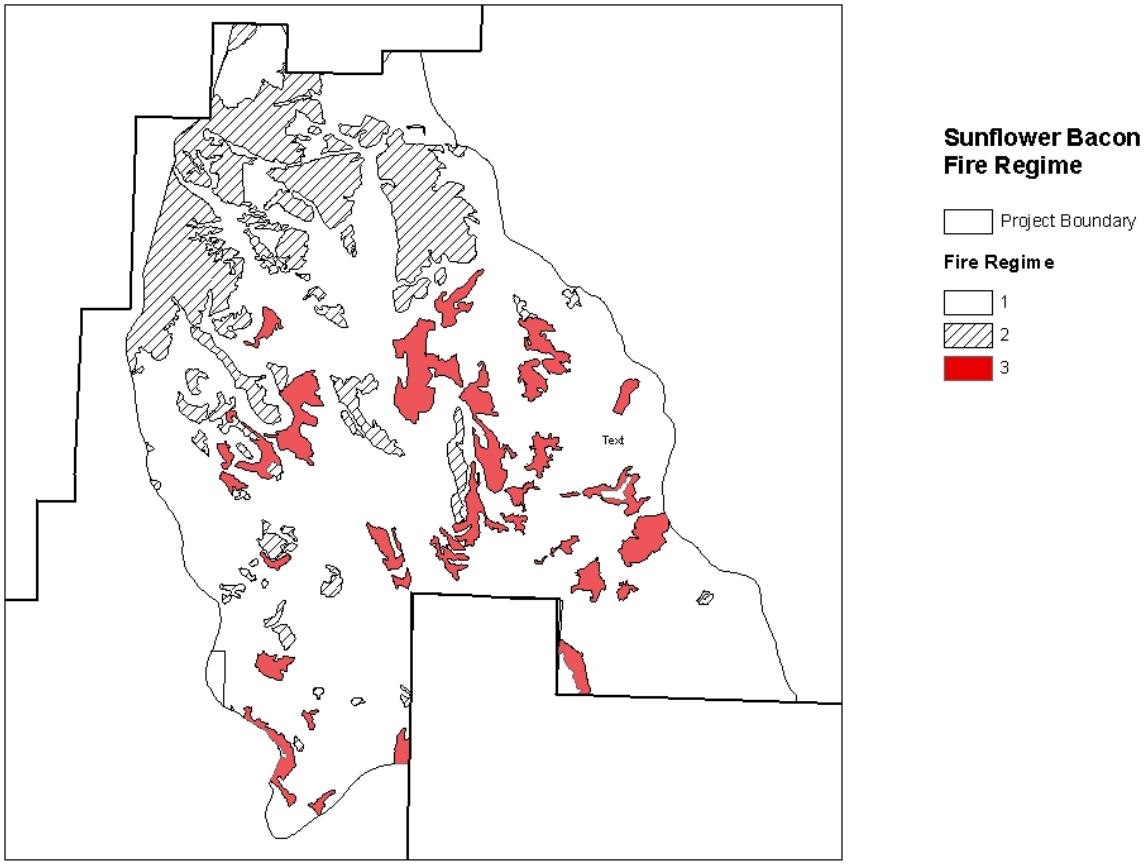



Figure 3. Sunflower Bacon Fire Regimes

## Condition Class

Condition classes are landscape level attributes showing the degree of departure from historic fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities. Table 1 summarizes attributes used in describing each of the three condition classes.

Table 1. Condition Class Definitions

| Condition Class | Fire regimes altered from their historical range | The risk of losing key ecosystem components | Fire frequencies departed | Vegetation attributes altered from their historic ranges | Use of Fire to restore historical fire regime |
|---|---|---|---|---|---|
| 1 | near | low | no more than one return interval | intact and functioning within | maintain |
| 2 | moderately | moderate | more than one return interval | moderately altered | Would need moderate levels of restoration treatments prior |
| 3 | significantly | high | multiple return intervals | significantly altered | Would need high levels of restoration treatments prior |

The Condition Class rating in the Sunflower Bacon analysis area is primarily that of a Condition Class 2 and 3. Currently 75% of the area analyzed is at risk of losing a key ecosystem component from a wildland fire or insect and disease epidemic. Fire frequencies have departed from historical frequencies by more than one return interval. The vegetative component of the condition class analysis is the basis for the rating of condition class 2 and 3. Vegetation attributes have been moderately to significantly altered from their historic ranges. Although ground fuel loading is within Forest Plan standards, this moderate to high condition class rating is the result of potential fire severity where vegetation conditions, composition and structure (ladder fuels) support significant overstory mortality and environmental effects, should a wildfire occur. Table F-2 identifies the quantity of each condition class within the upland forestlands of the Sunflower Bacon project area. Upland forests are where conditions have deviated the most from the Historical Range of Variability.

Table F-2. Condition Class acreages and percentages within the Sunflower Bacon Analysis Area.

| Condition Class | CC1 | CC2 | CC3 | Total |
|---|---|---|---|---|
| Acres | 3,482 | 3,992 | 6,626 | 14,100 |
| Percentage | 25% | 28% | 47% | 100% |

## *Direct and Indirect Effects*

### Alternative 1

Under Alternative 1, the Sunflower Bacon project area would continue to be managed under its current trend. No harvest or prescribed fire activities would occur under the direction of this environmental assessment. Fire suppression would continue increasing the amount of fire return intervals missed.

Condition Class 1 acres would continue to move toward Condition Class 2 & 3 conditions, that should a wildfire occur on an extreme weather day, there is a risk of losing a key ecosystem component. Vegetative attributes would continue to be altered from their historic ranges in terms of species composition, structure, and density, contributing to an increase in vertical fuel loadings and ladder fuels. Fire behavior would increase over time through increased flame lengths and intensities uncharacteristic of the historic role fire played in these dry sites.

### Alternative 2

Under Alternative 2, areas within the Sunflower Bacon analysis area would be mechanically thinned and prescribed burned to treat activity related slash. Landscape prescribed burning would occur, to maintain Condition Class 1, and to reduce fuel loadings.

Selected areas would be mechanically treated to reduce stocking levels and reduce understory ladder fuels. Fire Regime Condition Class 2 & 3 would be moved toward Condition Class 1 by reducing smaller diameter, fire intolerant species. Stands would be comprised of more historical conditions, described in terms of species composition, density, size, and structure. 2,456 acres of commercial thinning would take place and 704 acres of non-commercial thinning. Landscape prescribed fire would take place on 10,196 acres of the analysis area. These treatments would affect 64% of the total analysis area. The proposed thinning treatments, along with landscape prescribed underburns would do much to correct the fire regime condition class that has departed from its historical composition and structure.

Compared to existing conditions, Alternative 2 changes 1,040 acres of Condition Class 2 to Condition Class 1 and changes 1,651 acres of Condition Class 3 to Condition Class 1 through commercial harvest, non-commercial thinning, and prescribed burning. The overall percentage of Condition Class 1 would move from 25 % to 44 % of the area analyzed for FRCC. Prescribed underburning would move 1,433 acres of Condition Class 2 toward Condition Class 1 and maintain 1,545 acres already in Condition Class 1.

Table F-3. Condition Class acres within the Sunflower Bacon Analysis Area.

| | Existing Condition | Percentage | Alternative 2 | Percentage |
|---|---|---|---|---|
| Condition Class 1 | 3,482 | 25% | 6,173 | 44% |
| Condition Class 2 | 3,992 | 28% | 2,952 | 21% |
| Condition Class 3 | 6,626 | 47% | 4,975 | 35% |
| Total | 14,100 | 100% | 14,100 | 100% |

### Alternative 3

Under Alternative 3, areas within the Sunflower Bacon analysis area would be mechanically thinned and prescribed burned to treat activity related slash. Landscape prescribed burning would occur to maintain Condition Class 1 and to reduce fuel loadings.

Selected areas would be mechanically treated to reduce stocking levels and reduce understory ladder fuels. Fire Regime Condition Class 2 & 3 would be moved toward Condition Class 1 by reducing smaller diameter, fire intolerant species. Stands would be comprised of more historical conditions, described in terms of species composition, density, size, and structure. 1,604 acres of commercial thinning would take place and 681 acres of non-commercial thinning. Landscape prescribed fire would take place on 8,617 acres of the analysis area. These treatments would affect 52% of the total analysis area. The proposed thinning treatments, along with landscape prescribed underburns, would do much to correct the Fire Regime Condition Class that has departed from its historical composition and structure.

Compared to existing conditions, Alternative 3 changes 643 acres of Condition Class 2 to Condition Class 1 and changes 1,237 acres of Condition Class 3 to Condition Class 1, through commercial harvest, non-commercial thinning, and prescribed burning. The overall percentage of Condition Class 1 would move from 25 % to 38 % of the area analyzed for FRCC. Prescribed underburning would move 1,230 acres of Condition Class 2 toward Condition Class 1 and maintain 1,365 acres already in Condition Class 1.

Table F-4. Condition Class Changes for Alternative 3

| | Existing condition | Percentage | Alt 3 | Percentage |
|---|---|---|---|---|
| Condition Class 1 | 3,482 | 25% | 5,362 | 38% |
| Condition Class 2 | 3,992 | 28% | 3,349 | 24% |
| Condition Class 3 | 6,626 | 47% | 5,389 | 38% |
| Total | 14,100 | 100% | 14,100 | 100% |

### Alternative 4

Under Alternative 4, areas within the Sunflower Bacon analysis area would be mechanically thinned and prescribed burned to treat activity related slash. Landscape prescribed burning would occur to maintain Condition Class 1 and to reduce fuel loadings.

Selected areas would be mechanically treated to reduce stocking levels and reduce understory ladder fuels. Fire Regime Condition Class 2 & 3 would be moved toward Condition Class 1 by reducing smaller diameter, fire intolerant species. Stands would be comprised of more historical conditions, described in terms of species composition, density, size, and structure. Treatments would affect 58% of the total analysis area. The proposed thinning treatments, along with landscape prescribed underburns, would do much to correct the Fire Regime Condition Class that has departed from its historical composition and structure.

Compared to existing conditions, Alternative 4 changes 778 acres of Condition Class 2 to Condition Class 1 and changes 1,536 acres of Condition Class 3 to Condition Class 1 through commercial harvest, non-commercial thinning, and prescribed burning. The overall percentage of Condition Class 1 would move from 25% to 41% of the area analyzed for FRCC. Prescribed underburning would move 1,415 acres of Condition Class 2 toward Condition Class 1 and maintain 1,488 acres already in Condition Class 1.

Table F-5. Condition Class Changes for Alternative 4

| | Existing Condition | Percentage | Alt 4 | Percentage |
|---|---|---|---|---|
| Condition Class 1 | 3,482 | 25% | 5,796 | 41% |
| Condition Class 2 | 3,992 | 28% | 3,214 | 23% |
| Condition Class 3 | 6,626 | 47% | 5,090 | 36% |
| Total | 14,100 | 100% | 14,100 | 100% |

## Crown Fire Potential

### *Current Condition*

Crown fire potential is a function of surface fuel loading, canopy base height (CBH), and canopy bulk density (CBD). Surface fuel loading, canopy base height and canopy bulk density are stand characteristics rather than individual tree or patch characteristics (Scott and Reinhardt 2001).

In the Sunflower Bacon Analysis Area, current conditions would support crown fire. Currently 40% of the Sunflower Bacon Analysis Area is overstocked. Stocking levels, the abundance of understory vegetation, and arrangement of ladder fuels are the major contributors to the condition that would support crown fire.

Crown fire potential can be quantified to Canopy Bulk Density thresholds. Canopy Bulk Density above 0.0023 lbs/ft$^3$ is linked to active crown fire and Canopy Bulk Density below 0.0023 lbs/ft$^3$ makes crown fire impossible to unlikely (Fire Program Solutions 2001).

Historically, dry-forest sites seldom experienced crown fire; that is no longer true following widespread changes in species composition and forest structure over the last 100 years (Arno and Allison-Bunnell 2002).

Stand exam data from Forest Vegetation Simulator growth and yield models, seasonal fire weather, and predicted flame length from BEHAVEPLUS were all used for input. Crown fire predictions were run for the 97$^{th}$ percentile seasonal weather condition to depict worst case scenario should a wildfire occur. Stand exam data, representative of average conditions within the dominate plant associations, were used in the analysis for crown fire potential. The Douglas-fir plant association represents 66% of the proposed treatment units. The ponderosa pine plant association represents 33% of the proposed treatment units. Outputs from Crown Mass are displayed in Table F-6.

Table F-6. Predicted Canopy Base Height and Canopy Bulk Density for Douglas-fir plant association & Ponderosa pine plant association

| Attributes Existing Condition | Canopy Base Height (ft) | Canopy Bulk Density (#/ft/3) | Critical Canopy Bulk Density (#/ft/3) | Crown fraction Burned (%) | Type of fire |
|---|---|---|---|---|---|
| Douglas-fir plant association | 1 | 0.01820 | 0.0023 | 73-100 | Active |
| Ponderosa pine plant association | 12 | .02180 | 0.0023 | 0 | Surface |

The Douglas-fir plant association as modeled predicts an active crown fire with 73-100% of the crown being burned. Canopy base height of 1 foot shows fuels close to the ground that can act as ladder fuels. Critical canopy bulk density is the minimum bulk density needed to sustain a crown fire once it is initiated.

Canopy bulk density above the minimum, or critical bulk density, (0.0023 #/ft/3) demonstrate that the bulk density be at a level capable of sustaining fire through the crowns. Figures below the minimum would show the bulk density to be at a level unable of sustaining fire through the crowns.

The ponderosa pine plant association as modeled predicts a surface fire with 0% of the crown being burned. Canopy base height of 12 foot shows separation between surface fuels and crown fuels. Canopy bulk density is above the critical bulk density level and shows bulk density levels capable of sustaining fire through the crowns. Although this predicts a surface fire with zero percentage of the crown being burned, if we lowered the canopy base height to 11 feet the model predicts passive and active crown fires.

## *Direct and Indirect Effects*

### Alternative 1

The potential for crown fires in the Sunflower-Bacon analysis area would continue to be moderate to high based on no treatment of the dense stands. Canopy base height would continue to be at heights that would allow a surface fire to transition vertically into the crowns of trees.

Canopy bulk density would remain above the critical threshold for canopy bulk density. Crown fuel loading would remain at levels that would allow crown fires, once initiated, to spread through the crowns independent of a surface fire.

Of the proposed acres for treatment, there are 1,578 acres with attributes that increase the potential for crown fires. 879 additional acres of the proposed treatment acres would be at risk of crown fires.

Table F-7. Canopy Bulk Density

| | Existing condition Douglas-fir plant association | Existing condition ponderosa pine plant association |
|---|---|---|
| Canopy base height | 1 Foot | 12 Feet |
| Canopy bulk density | 0.0182 | 0.0218 |
| Critical Bulk density | 0.0023 | 0.0023 |

### Alternative 2

Crown fire potential would be reduced by increasing canopy base height and reducing canopy bulk density on 2,456 acres. Modeled outputs from CrownMass show after treatment canopy base heights are increased to 26-30 feet and canopy bulk densities are reduced 9-35 % across the analysis area. By reducing stocking densities and ladder fuels the potential for crown fires within the analysis area would be reduced (Table F-8).

Table F-8. Canopy Bulk Density for Alternative 2

| | Alternative 2<br>Douglas-fir plant association | Alternative 2<br>Ponderosa pine plant association |
|---|---|---|
| Canopy Base Height | 26 Feet | 30 feet |
| Canopy Bulk Density | 0.01190 | 0.02000 |

Alternative 3

Crown fire potential would be reduced by increasing canopy base height and reducing canopy bulk density on 1,604 acres. Modeled outputs from CrownMass for alternative 3 is the same as alternative 2, only the acres affected would change.

Alternative 4

Crown fire potential would be reduced by increasing canopy base height and reducing canopy bulk density on 2,057 acres. Modeled outputs from CrownMass for alternative 4 is the same as alternative 2 and 3, only the acres affected would change.

## Crown Fire Transition

### *Current Condition*

The threshold point where a surface fire transitions to a crown fire is expressed as the Critical Fireline Intensity, (Icritical) (Van Wagner, 1977, 1993). Icritical is based on independent variables crown base height (CBH) and the crown foliar moisture content (M) (Fire Program Solutions, 2001). CrownMass calculated the Crown Base Height as 1 foot for the Douglas-fir plant association and 12 feet for the ponderosa pine plant association. Along with foliar moisture content, Icritical can be ascertained by the following computations. Van Wagner's crown initiation model is shown below in English units (Alexander, 1988).

Icritical = (0.003096 * CBH *(197.50 + 11.186 *M ))^1.5

Where:

Icritical = Fireline Intensity (BTU/ft/s)

CBH = Crown Base Height (ft)

M = Foliar Moisture content (%)

Figure 4. Crown fire initiation model (Alexander, 1988).

Crown fire transition can be determined if Isurface $\geq$ Icritical. Where Isurface is surface fireline intensity derived from BEHAVEPLUS and Icritical is the threshold for transition from a surface fire to a crown fire. Surface fuel models 2, 9, and 10 accounts for 70 % of the analysis area and were used in the calculation.

Table F-9. Predicted Surface Intensities vs. Critical Intensities needed for crown fire transition.

| Attribute | Fuel Model 2 (grass understory) | Fuel Model 9 (timber) | Fuel Model 10 (timber) |
|---|---|---|---|
| Isurface | 200 (BTU/ft/s) | 38 (BTU/ft/s) | 166 (BTU/ft/s) |
| Icritical in Douglas-fir plant association | 6 (BTU/ft/s) | 6 (BTU/ft/s) | 6 (BTU/ft/s) |
| Icritical in ponderosa pine plant association | 259 (BTU/ft/s) | 259 (BTU/ft/s) | 259 (BTU/ft/s) |

Crown fire initiation predictions show that under existing conditions Isurface $\geq$ Icritical in the Fire Behavior Prediction System fuel models 2, 9, and 10 and crown fire initiation is probable in 1,577 acres of the proposed treatment acres, and 879 acres are at risk of crown fire. While the analysis for Ponderosa pine plant association shows that it is within the thresholds for crown fire transition, canopy bulk density levels are still above the critical level needed to support crown fires. This is based on the predicted CBH of 12'. For comparison, if the predicted CBH was lowered by one foot the model predicts passive and active crown fires. Another measure to be used when considering crown fire transition is fireline intensity. Fireline intensity must reach a critical threshold for the fire to transition from surface fire to crown fire.

## *Direct and Indirect Effects*

### Alternative 1

Surface fire line intensities would remain above the critical intensity needed for crown fire transition in 1,577 acres of the proposed units for treatment. These levels, in combination with the canopy base height, allow surface fire to transition to the crowns.

Table F-10. Surface Fireline Intensities vs. Critical Fireline Intensities

| Attribute | Fuel Model 2 | Fuel Model 9 | Fuel Model 10 |
|---|---|---|---|
| Isurface | 200 (BTU/ft/s) | 38 (BTU/ft/s) | 166 (BTU/ft/s) |
| Icritical in Douglas-fir plant association | 6 (BTU/ft/s) | 6 (BTU/ft/s) | 6 (BTU/ft/s) |
| Icritical in ponderosa pine plant association | 259 (BTU/ft/s) | 259 (BTU/ft/s) | 259 (BTU/ft/s) |

### Alternative 2

Critical surface fire line intensity is the threshold point where a surface fire transitions to a crown fire. For a fire to transition, the surface intensity must be higher than the critical intensity. Proposed treatments modeled in CrownMass show stand characteristics that make it improbable that a high intensity surface fire would transition into a crown fire on the 2,456 acres that would be treated with commercial thinning.

Table F-11. Fireline Intensities for Alternative 2

| Attribute | Fuel Model 2 | Fuel Model 9 | Fuel Model 10 |
|---|---|---|---|
| Isurface | 200 | 38 | 166 |
| Icritical in Douglas-fir plant association after treatment | 1022 (BTU/ft/s) | 1022 (BTU/ft/s) | 1022(BTU/ft/s) |
| Icritical in ponderosa pine plant association after treatment | 825(BTU/ft/s) | 825 (BTU/ft/s) | 825 (BTU/ft/s) |

#### Alternative 3

Proposed treatments modeled in CrownMass show stand characteristics that make it improbable that a high intensity surface fire would transition into a crown fire on the 1,604 acres that would be treated with commercial thinning.

#### Alternative 4

Proposed treatments modeled in CrownMass show stand characteristics that make it improbable that a high intensity surface fire would transition into a crown fire on the 2,057 acres that would be treated with commercial thinning.

## *Cumulative Effects*

### Past Activities

Past activities that have occurred include harvest, grazing, fire suppression, and hazardous fuels burning. The last harvest activities occurred in 1995 with 49 acres being treated. It is generally accepted that fire suppression and past large-tree harvesting operations have contributed to excess tree densities and fuel loads in ecosystems that developed with relatively short fire intervals (Brown, 2000).

These past activities have all played a role in the condition of the Sunflower-Bacon project area. The existing stands of fire intolerant species can be attributed to these past actions. Vertical arrangement and horizontal continuity of many arid and semi-arid, low-elevation forests in the Western United States differ from historical stand structure (Carey and Schumann, 2003, Mutch et al., 1993). Current forests have dense canopies, higher proportion of fire-intolerant species, and fewer large trees (Bonnicksen et al., 1982). These conditions increase the probability of surface fires developing into the crown fires, because understory ladder fuels lower the effective canopy base height. This departure from historical conditions is common in high-frequency, low-to-moderate-severity fire regimes (Agee et al., 1991).

### Present and Reasonably Foreseeable Actions

Currently fire suppression and grazing are the only activities occurring in the Sunflower-Bacon analysis area. Fire suppression and grazing affect condition class by allowing fire intolerant species to establish and grow increasing stand density, canopy bulk density and lowering canopy base height. Fire suppression would allow fine dead fuel loadings to increase slightly over time, until they decay naturally or are consumed by fire.

# WILDLIFE HABITAT

This section incorporates by reference the Sunflower Bacon Terrestrial Wildlife Report contained in the project file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the alternatives are discussed in this section.

## Scope of the Analysis

The scale of the analysis differs based on the species and habitats being considered. Late and old structure, old growth habitat, and habitat connectivity was assessed at the subwatershed scale, with consideration given to connectivity of late and old structure habitat and old growth to habitats outside the boundaries of the analysis area. Snags and downed wood were assessed at the scale of the Wall Creek watershed for the dry upland and moist upland Potential Vegetation Groups (PVGs). The scale of analysis for the Rocky Mountain elk varies depending on standards and direction given by the Forest Plan. In the E1 Management Area (Timber and Forage), the scale of analysis is that portion of the E1 Management Area that lies within the Alder/Upper Skookum subwatershed. For the C3 Management Area (Big Game Winter Range), the scale of analysis extends outside the analysis area to the entire Monument winter range. The scale of analysis for Endangered, Threatened, and Sensitive species, Species of Interest, and Neotropical Migratory Birds was the Alder/Upper Skookum subwatershed.

The quantity and quality of wildlife habitat and the effects of the proposed activities on these habitats were assessed using:

- Notes, summaries, and other documents generated from field visits to the project area in 2005
- Aerial photos
- Covers, data tables, graphics, maps and other information within and/or generated from information stored within the corporate Geographic Information System (GIS) database on the Heppner and North Fork John Day Ranger Districts and Umatilla National Forest
- FAUNA database and Heppner Ranger District Wildlife Database (sighting reports and locations within the project area), including past rare furbearer surveys (surveys were carried out in the winter from snowmobiles on designated routes. All tracks encountered were identified to species and recorded) and peregrine falcon surveys (aerial and land surveys of potential nesting cliffs, surveyed in earl 1990's).
- Goshawk surveys completed in June 2005. Aerial photos were used to identify potential nesting habitat within the area.
- DecAID Advisor
- Vegetative information from the District Silviculturist (personal communications, specialist report, and the vegetation database)
- Publications, reports, scientific papers and personal communications. Those utilized are documented and cited within the wildlife report and BE, as well as the EA

Where quantitative information is available, it is presented.

## Management Indicator Species

MIS species for the Forest are presented in Table W-1.

Table W-1. Wildlife Management Indicator Species on the Umatilla National Forest (Forest Plan 1990, p2-9)

| Species | Habitat Types |
|---|---|
| Rocky Mountain Elk | General forest habitat and winter range |
| Pileated woodpecker | Dead/down tree habitat (mixed conifer) in mature and old stands |
| Northern three-toed woodpecker | Dead/down tree habitat (lodgepole pine) in mature and old stands |
| Pine marten | Mature and old stands at high elevations ($\geq$ 4,000 ft.) |
| Primary cavity excavators | Dead/down tree (snag) habitat |

Rocky Mountain elk and a number of primary cavity excavators are known to occur in the analysis area. There is a potential that the pileated woodpecker may occur in the analysis area due to the presence of suitable habitat (approximately 238 acres of moist upland forest habitat). The potential effects on the Rocky Mountain elk, primary cavity excavators (PCEs), and the pileated woodpecker would be analyzed in this document. Potential effects on the pine marten and the northern three-toed woodpecker would not be considered in this document because suitable habitat (moist and cold upland habitats at higher elevations) does not occur in the analysis area (terrestrial wildlife specialist report).

## Rocky Mountain Elk

### *Current Condition*

The Rocky Mountain elk was not present in the planning area until the late 1960's and early 1970's. Initially, elk herds remained in the higher elevations and did not utilize the winter range. Approximately half of the analysis area is designated as big game winter range (Management Area C3; 9,967 acres). The State of Oregon manages a herd of approximately 200 elk that winter in the Sunflower Bacon analysis area (Steve Cherry, ODFW, Personal Communication). These elk are highly mobile and tend to move in and out of the analysis area throughout the winter depending on weather conditions. Summer and winter foraging habitat for the elk consists of a variety of grasses and shrubs. Ground cover concealment, often in the form of shrubs, downed wood, or broken terrain, is important for elk calving. Calving occurs in areas where open forage areas are adjacent to good escape cover. This type of habitat is located throughout the analysis area. Currently, the elk population is slightly below management objectives set by the State of Oregon for the Heppner Wildlife Management Unit). The bull to cow ratio in the Heppner unit (9 bulls per 100 cows in spring 2006) is slightly below management objectives for the unit. Currently (2006), there are approximately 18 calves per 100 cows (post winter estimate) in the Heppner unit.

Activities are proposed in the E1, C3, and C5 management areas. The Monument Winter Range is restricted to the southern (lower elevation) portion of the analysis area. The Monument Winter Range is the largest winter range (approximately 59,800 acres) on the Forest. It generally occurs on the southern portion of the Heppner Ranger District from Tamarack Creek to east of Potamus Creek. Approximately half of the Sunflower Bacon analysis area (50 percent) consists of winter range habitat. Satisfactory cover currently accounts for 10.2 percent and total cover 43 percent of the winter range. There are approximately 46.3 miles of open road in the winter range, resulting in an open road density of 0.5 miles per square mile for the area during the winter use period.

An analysis of elk habitat effectiveness was conducted for the Monument winter range. The current habitat effectiveness index value for the winter range is 69. The Forest plan standard for HEI in winter range habitat is 70. The existing value is the result of cover and forage not being well distributed across the winter range, the low natural potential of the hot dry and warm dry biophysical environments to sustain satisfactory cover in the long-term across the winter range, and 46.3 miles of open road in the winter range. The habitat effectiveness value of 69 (existing condition) is not consistent with the Forest Plan standard which states “Elk habitat would be managed on designated big game winter ranges to achieve a habitat effectiveness index of no less than 70, including discounts for roads open to motorized vehicular traffic as described in Wildlife Habitats in Managed Forest (Thomas et al., 1979). A sensitivity analysis of habitat effectiveness index was conducted for the Monument winter range relative to open roads. A total of 6.7 miles of road would need to be closed during the winter use period to achieve an HEI value of 70. If all of the open roads in the winter range were closed, an HEI value of 75 would result. While achieving a habitat effectiveness index of no less than 70 is theoretically possible and may be achieved someday, achieving this index was not a purpose and need for action for this specific project (EA, Chapter 1).

HEI standards in the Forest Plan also apply to the E1 management area. Currently, the HEI in the E1 management area is 59. Satisfactory cover and total cover make up 3.2 percent and 28.2 percent of the E1 management area allocation in the analysis area, respectively. The existing condition for the habitat effectiveness index is well above the Forest Plan standard of 30 (Forest Plan 4-179). There are no standards for satisfactory or total cover in this management area.

## *Direct and Indirect Effects*

### Alternative 1

In the short term, elk habitat would remain unchanged. The amount of satisfactory and total cover and HEI values in the C3 and E1 management areas would remain the same on this time scale.

With the existing management direction, including fire suppression, stands would continue to grow and develop a multistory structure, increasing the amount of total cover above 45 percent (existing 43 percent) and satisfactory cover above 15 percent (existing 10.2 percent) in the mid and long term in the Monument winter range. Satisfactory cover would increase above 5 percent and total cover above 30 percent at this time scale in the E1 management area. Overall, the elk habitat effectiveness index would remain near 69 or decrease slightly for the Monument winter range because patches of forage would, over time, become cover, reducing the distribution of cover and forage. HEI in the E1 area is expected to stay the same or increase slightly due to an increase in cover habitat. An increase in cover and multi-layer condition would increase the risk of high severity wildland fires and insect or disease outbreaks in the analysis area. A disturbance event similar to the Wheeler Point fire in 1996 (22,000 acres) and the Monument Complex fire in 2001 (32,000 acres) is likely given that the Sunflower Bacon analysis area has similar vegetative conditions. These events shifted cover habitat to forage habitat, resulting in a reduction of total cover and satisfactory cover in the Monument winter range. If a similar event occurs in the Sunflower Bacon analysis area the habitat effectiveness index for the Monument winter range and E1 management area allocation would likely decrease due to reductions in cover (satisfactory and total) and an increase in forage habitat.

The open road density in the Monument winter range during the winter use period would remain at 0.5

miles per square mile. With the current management direction, the open road density is not expected to change in the Monument winter range.

### Alternative 2

Proposed treatment activities would occur in satisfactory and marginal cover in the Monument winter range under this alternative (see Table W-2). Under this alternative, 133 acres of satisfactory cover habitat would be converted to marginal cover habitat and 577 acres of marginal cover would be converted to a forage condition.

Table W-2. Effects of Alternatives on Big Game Winter Range Habitat (MA C3) in the Sunflower Bacon Analysis Area (Monument Winter Range)

| Habitat Parameter | Forest Plan Standard | Alternative | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| Satisfactory Cover (%) | ≥10 | 10.2 | 10.0 | 10.2 | 10.2 |
| Total Cover (%) | ≥30 | 43.0 | 41.9 | 43.0 | 42.5 |
| Habitat Effectiveness Index | ≥70 | 69 | 69 | 69 | 69 |

Conversion of cover habitat to lower quality cover or forage habitat may affect the distribution of elk within the analysis area. Elk would be less likely to use cover habitat converted to forage habitat. Dense multi-strata habitat (satisfactory and the higher end of marginal cover habitat) preferred by elk for hiding cover would be reduced. Elk vulnerability would increase as a consequence of reduced stand densities (i.e. increased sight distance) in all commercial and non-commercial harvest units, particularly where these units are adjacent to open forest roads. The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery use (crushing low vegetation and structure) and burning (consumption of vegetation and brush). This vegetation would recover in the years following burning and machinery use.

In the Monument winter range, total cover would be reduced to 41.9 percent and satisfactory cover to 10 percent. This would yield a habitat effectiveness index of 69. Total cover is above the minimum standard of 30 percent for the winter range and satisfactory cover meets the minimum standard of 10 percent (lower range of “desirable”) identified in the Forest Plan. Under this alternative, the habitat effectiveness value would remain below the habitat effectiveness index standard of 70 identified in the Forest Plan, but unchanged when compared to the existing condition within the winter range (HEI = 69). The constituent elements of the HEI calculation (percent satisfactory and marginal cover), however, would be affected.

All cover related values displayed in Table W-2 are consistent with Forest Plan standards for the entire Monument Winter Range. In meeting the cover related management direction for elk in the C3 management area, the Monument winter range will continue to provide sufficient cover habitat (total, satisfactory, and marginal), as well as continue to contribute to the elk population management objectives of the State of Oregon. As such, it follows that recreational hunting opportunities (State issued permits) will continue in the Monument Winter Range. An index of 69, while not 70, provides a high level of potential habitat effectiveness and maintains elk populations near management objectives. The forest plan habitat effectiveness index amendment for the Sunflower Bacon project would change the habitat effectiveness index value from 70 to the existing condition of 69 in the Monument winter range for the duration of the Sunflower Bacon project. Achieving a habitat effectiveness index of no less than 70 was not a purpose and need for action for this specific project. The direct and indirect effects of the amendment is that elk habitat effectiveness would remain unchanged (at the winter range scale) from current conditions. In addition, future projects that are intended to improve habitat effectiveness index are not precluded, nor is the attainment of an HEI value of 70 prevented.

Within the Sunflower Bacon analysis area (a portion of which lies within the Monument Winter Range), the proposed harvest activities have the potential to alter the distribution of elk within the analysis area and the amount of time they spend on National Forest System lands. These impacts could affect the ability of the state to manage elk within the analysis area. Given the level of harvest (3,160 acres), the vulnerability of elk to hunting would increase. A majority of the dense stands of cover within the analysis area would be treated. Increased sight distances resulting from non-commercial and commercial thinning activities would make elk more visible to hunters and reduce the size and quality of “security areas” used by elk when they are disturbed. Hunting pressure similar to what is currently occurring coupled with increased vulnerability could result in elk spending less time on National Forest System lands and more time on adjacent private lands.

In management area E1, commercial and non-commercial thinning activities would result in a net decrease of 70 acres of marginal cover. Satisfactory cover would be converted to marginal cover on approximately 16 acres. As a result of management activities occurring in E1, satisfactory cover and total cover would change very little (3 percent and 28 percent, respectively) after treatments. The habitat effectiveness index for E1 would decrease to 58 after treatment. HEI would remain above the Forest Plan standard (HEI ≥30) after treatment. Commercial and non-commercial thinning would decrease stand densities (increase sight distances), potentially increasing the vulnerability of big game to hunting.

Temporary roads would not change open road densities because these roads would be decommissioned following harvest. Temporary roads would not cause fragmentation of habitat; generally, there are existing openings where these temporary roads would be constructed. Understory vegetation and some trees may be affected by temporary road construction; however, the magnitude of this effect would be quite small. Use of temporary roads and system roads (open and closed) within the analysis area would increase road-related disturbance on elk due to increased traffic volumes. Elk may avoid some areas during treatment and road use. It is unlikely that this level of road use would cause elk to move out of the analysis area; they would likely shift their use to adjacent areas where disturbance is minimal.

Activity fuels treatment (2,222 acres landscape burning and 234 acres mechanical) would affect understory vegetation on approximately 2,456 acres. An additional 942 acres within harvest units and 704 acres outside harvest units would be non-commercially thinned, reducing hiding cover and increasing sight distances in these stands. Patches of young trees would be maintained in all non-commercial thinning stands to provide cover for wildlife. Burning would result in grasses, shrubs, and pockets of regenerating conifers to be consumed. Within a year after the burn, grasses, forbs, and shrubs would re-occupy the more open understories and areas adjacent to piles.

Landscape burning (10,196 acres) would temporarily remove grasses, shrubs, and seedlings in the understory. Landscape burning would occur in the spring or fall depending on weather and fuel characteristics. Landscape burning would occur in blocks within the analysis area. Blocks would be as small as several hundred acres and as large as 1,000 acres or more. These burns would be planned such that adjacent blocks would be burned in different years. Under this “rotation” system, forage for wintering elk would be maintained in portions of the analysis area, if fall burning occurs. There would be no impact on the condition or distribution of wintering elk in the analysis area as a result of landscape burning, should fall burning occur. Prescribed underburns would improve the quality and quantity of forage in the analysis area, depending on the weather, timing, and location of the prescribed fire. Forage for lactating cows and calves would improve for several years following burning in individual burn blocks; burning over a number of years would provide high quality forage in the analysis area in the mid term. Prescribed burning is not expected to alter the cover condition in the project area; they would be low intensity underburns that would only affect ground fuels and understory vegetation. A fire of this intensity would not affect overstory vegetation.

#### Alternative 3

The effects of this alternative would be similar to those described under Alternative 2. Commercial harvest and non-commercial thinning activities would affect approximately 2,285 acres in the project area. Under this alternative, there would be no change in either satisfactory or marginal cover habitat. Treatment (commercial and non-commercial thinning) of marginal cover habitat within the analysis area would increase sight distances in these stands, and increase vulnerability of elk to hunting; however, treated marginal cover stands in the winter range would still be considered marginal cover after harvest. Satisfactory cover, a portion of the existing marginal cover, and several larger units in the eastern portion of the analysis area would not be treated in order to maintain HEI and retain cover that provides security and hiding areas for big game animals. The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery use and burning. This vegetation would recover in the years following burning and machinery use.

Under this alternative, total cover would be maintained at 43 percent and satisfactory cover would remain 10.2 percent in the winter range. This would yield a habitat effectiveness index of 69. Total cover would remain above the minimum standard of 30 percent for the winter range and satisfactory cover exceeds the minimum standard of 10 percent (lower range of “desirable”) identified in the Forest Plan. The habitat effectiveness index would remain below the habitat effectiveness index standard of 70 identified in the Forest Plan, but unchanged when compared to the existing condition within the winter range. The constituent elements of the HEI calculation (percent satisfactory and marginal cover) would not change under this alternative.

All cover related values displayed in Table W-2 for Alternative 3 are consistent with Forest Plan standards for the entire Monument Winter Range. In meeting the cover related management direction for elk in the C3 management area, the Monument Winter Range would continue to provide sufficient cover habitat (total, satisfactory, and marginal) and continue to contribute to the elk population management objectives of the State of Oregon. As such, it follows that recreational hunting opportunities (State issued permits) would continue in the Monument Winter Range. An index of 69, while not 70, provides a high level of potential habitat effectiveness and would maintain elk populations in the management area near management objectives. Because there would be no change (reduction) in the constituent elements of the HEI calculation (percent satisfactory and marginal cover and the spatial distribution of cover and forage), a Forest Plan amendment would not be required to waive or change the HEI standards for the Monument Winter Range under this alternative. HEI would be unaffected by treatment activities.

Elk vulnerability would increase in treated stands. It is possible that elk would avoid thinned stands following treatment, especially where these stands are adjacent to open forest roads.

The effects of commercial and non-commercial harvest on the E1 management area would be the same as those described under Alternative 2.

Temporary roads constructed during harvest would have no impact on the existing road density in the analysis area or the Monument winter range. Use of roads within the analysis area would have similar effects as those described under Alternative 2. Temporary roads would not cause fragmentation of habitat; generally, there are existing openings where these temporary roads would be constructed. Under this alternative, approximately 1.1 miles of seasonally open road would be closed to partially compensate for increased vulnerability in thinned stands. Approximately 46.3 miles of road would continue to be open during the winter use period in the Monument winter range after treatment. Open road density in the Monument Winter Range would remain .5 miles per square mile after treatment.

The effects of activity fuels treatment would be similar to those described under Alternative 2. Approximately 1,604 acres of activity fuels treatment (1,361 acres landscape burning and 243 acres mechanical) would occur under this alternative. This activity would not affect big game cover habitat in the analysis area. Approximately 681 acres within harvest units and 681 acres outside harvest units would be non-commercially thinned, reducing hiding cover and increasing sight distances in these stands. Patches of young trees would be maintained in all non-commercial thinning stands to provide cover for wildlife. Landscape burning (8,617 acres) would temporarily remove grasses, shrubs, and seedlings in the understory. Satisfactory cover habitats (those with high stand densities and generally higher fuel loading) would not be prescribed burned due to the high fuel loading in these stands. Untreated marginal habitats would be burned because they are unlikely to burn at an intensity that would reduce their quality as cover habitat. Prescribed fires would be low intensity underburns that would only affect ground fuels and understory vegetation. A fire of this intensity would not affect overstory vegetation. The quality and quantity of forage would increase in the years following prescribed burning. Forage for lactating cows and calves would improve for several years following burning in individual burn blocks; burning over a number of years would provide high quality forage in the analysis area in the mid term.

#### Alternative 4

The effects of this alternative would be similar to those described under Alternative 2. Commercial harvest and non-commercial thinning activities would affect approximately 2,761 acres in the project area. Under this alternative, there would be no net loss (decrease) of satisfactory cover habitat. Satisfactory cover stands and several larger units in the eastern portion of the analysis area would not be treated in order to retain cover that provides security and hiding areas for big game animals. Approximately 476 acres of marginal cover would be treated with a variable-density thinning prescription under this alternative. Variable density thinning would create a mosaic of stand structures (densities) within treatment units. Stands would be thinned at varying densities, retaining patches with higher densities ranging from ¼ to ½ an acre in size. These patches would retain a portion of the hiding cover that currently exists in these stands. Because these marginal cover stands (476 acres) would be a mosaic of open stands and dense pockets of timber, they would be classified as forage habitat after harvest. Treatment (commercial and non-commercial thinning) of other habitat (including some marginal cover) within the analysis area would increase sight distances in these stands, and increase vulnerability of elk to hunting, especially where open roads are adjacent to treatment units. The proposed activities could temporarily increase the vulnerability of calves to predation due to reduced ground cover resulting from machinery use and burning; however, dense pockets of timber maintained in variable density thinning units would maintain good hiding cover for elk and their calves.

Under this alternative, total cover in the C3 management area would be reduced to 42.5 percent and satisfactory cover would remain 10.2 percent. This would yield a habitat effectiveness index of 69.

Total cover would exceed the minimum standard of 30 percent for the winter range and satisfactory cover would exceed the minimum standard of 10 percent (lower range of "desirable") identified in the Forest Plan. Under this alternative, the habitat effectiveness index would remain below the habitat effectiveness index standard of 70 identified in the Forest Plan, but unchanged when compared to the existing condition within the winter range.

All cover related values displayed in Table 12 for Alternative 4 are consistent with Forest Plan standards for the entire Monument Winter Range. In meeting the cover related management direction for elk in the C3 management area, the Monument Winter Range would continue to provide sufficient cover habitat (total, satisfactory, and marginal) and continue to contribute to the elk management population objectives of the State of Oregon. As such, it follows that recreation hunting opportunities (State issued permits) would continue in the Monument Winter Range. An index of 69, while not 70, provides a high level of potential habitat effectiveness and maintains elk populations in the management area near or above management objectives.

Although elk vulnerability would increase under this alternative, when compared to the No Action Alternative, several large security areas in the eastern portion of the analysis area and satisfactory cover stands would be retained. Variable density thinning would also maintain a portion of the existing cover in a mosaic pattern on approximately 476 acres.

A Forest Plan amendment would be required under this alternative because stands currently classified as marginal cover would be converted to forage habitat. The amendment for the Sunflower Bacon project would change the habitat effectiveness index value from 70 to the existing condition of 69 in the Monument Winter Range for the duration of the Sunflower Bacon project. The direct and indirect effect of the amendment is that elk habitat effectiveness would remain unchanged from the current conditions. Achieving a habitat effectiveness index of no less than 70 was not a purpose and need for action for this specific project. In addition, future projects that are intended to improve habitat effectiveness index are not precluded, nor is the attainment of an HEI value of 70 prevented.

The effects of commercial and non-commercial thinning on the E1 management area would be the same as those described under Alternative 2.

Use of temporary and system roads within the analysis area would have similar effects as those described under Alternative 2. Temporary roads would not cause fragmentation of habitat; generally, there are existing openings where these temporary roads would be constructed. These roads would be decommissioned after completion of thinning activities. Under Alternative 4, approximately 1.1 miles of seasonally open road would be closed to partially compensate for increased vulnerability in thinned stands. Approximately 46.3 miles of road would remain open during the winter use period in the Monument winter range after treatment. Open road density in the Monument Winter Range would remain 0.5 miles per square mile after treatment.

The effects of activity fuels treatment and landscape burning would be similar to those described under Alternative 2. Approximately 2,057 acres of activity fuels treatment (1,784 acres burning and 273 mechanical) would occur under this alternative. Approximately 781 acres within harvest units and 704 acres outside harvest units would be non-commercially thinned, reducing hiding cover and increasing sight distances in these stands. Patches of young trees would be maintained in all non-commercial thinning stands to provide cover for wildlife. Landscape burning (9,347 acres) would temporarily remove grasses, shrubs, and seedlings in the understory. Satisfactory cover habitats (those with high stand densities and generally greater fuel loading) would not be burned due to the high fuel loading in these stands. Landscape burning would occur in the spring or fall depending on weather and fuel characteristics. Forage for lactating cows and calves would improve for several years following burning in individual burn blocks; burning over a number of years would provide high quality forage in the analysis area in the mid term. Prescribed burning is not expected to alter the cover condition in the project area. Overstory vegetation (which provides satisfactory and marginal cover) would not be affected by a fire of this intensity.

## *Cumulative Effects*

### Alternative 2

Past activities that have affected elk habitat (cover and forage) and habitat effectiveness index values reflect past timber harvest (25,842 acres within the Sunflower Bacon analysis area), private land timber harvest (approximately 1,000 acres of recent harvest acres), road construction, road closures (access and travel management), fire suppression (exclusion), and grazing. Timber harvest and private land logging has impacted the structure and composition of cover habitat through the removal of trees and understory vegetation. These activities increased the amount of forage while reducing cover habitat. Partial cuts, particularly those that occurred well into the past are currently providing cover habitat. Overstory removal areas are still recovering from these treatments.

Road construction associated with past timber harvest and recreational development increased road densities and road-related disturbance during all seasons of the year. More recent road closures have reduced road densities during and outside the winter use period, decreasing disturbance and vulnerability of elk to hunting.

Decades of fire exclusion have reshaped the landscape of the analysis area. Historically, fire played a role in thinning the forest and maintaining grass-dominated understories and a higher proportion of fire resistant species, such as ponderosa pine. Fire exclusion has resulted in an increase in the density of trees and a change in species composition (Vegetation Section). Ironically, fire exclusion may have contributed to the amount and distribution of total cover. While beneficial to elk, these increases may not be sustainable over time, partly because fire and insect disturbances within the ponderosa pine ecosystem are inevitable.

Cattle (particularly sheep) grazing pressure was historically much higher than what is currently occurring in the winter range. Past grazing reduced species diversity in grassland and shrubland habitats, reducing the quality of forage habitats. The current cover and habitat effectiveness index values for the Monument winter range (Table W-2) and E1 management area reflect the sum of impacts of all past human actions and natural disturbances.

Present activities and events in the Monument winter range include timber harvest (approximately 5,075 acres) and salvage (528 acres). Ongoing activities in the analysis area include fire suppression and grazing. The Rimrock and Bologna Basin projects would decrease cover habitat and alter the distribution of cover and forage in the Monument winter range. The existing condition of cover and HEI presented in Table W-2 (Alt 1, Existing Condition) incorporates all of the changes that would occur under these projects. The Rimrock project would also close open roads within the Monument winter range. The cumulative result of these projects in the winter range would be no change in the habitat effectiveness index. Cumulatively, satisfactory and total cover would meet Forest Plan standards in the winter range when all of these projects are considered. These projects would also increase the vulnerability of elk to hunting through thinning activities that would open up dense cover stands. Fire suppression would continue to promote the development of dense multi-strata habitats within the analysis area and the entire winter range, increasing cover above existing levels in the long term. Prescribed burning (approximately 30,000 acres under the Rimrock project) would begin to reverse the impacts of past fire suppression, reintroducing fire into historically fire-prone areas and reducing accumulated fuels. The potential for livestock grazing to compete with big game for forage is small. Monitoring indicates that grazing within the analysis area is consistent with Forest Plan standards for forage utilization.

Reasonably foreseeable future activities and events with the potential to affect elk habitat effectiveness and road densities in the Monument winter range include timber harvest and silvicultural treatment (Falls Meadowbrook Vegetation Management Project), road closures, grazing, and fire suppression. The Falls Meadowbrook project would treat satisfactory and marginal habitat in the Monument winter range. The cumulative impact of this project, when combined with past, present, and future vegetation management projects in the winter range, would maintain the existing HEI value of 69. Satisfactory cover and total cover would meet Forest Plan standards when the effects of this project are combined with those of the proposed action. Future road closures within the Sunflower Bacon analysis area would reduce road density and disturbance in the winter range. Grazing and fire suppression would continue to have the same effects as those that are presently occurring.

Based on the cumulative impacts of past, present, and future actions in the Monument Winter Range, satisfactory cover would account for 10 percent of the area, total cover 41.9 percent of the area and HEI would remain unchanged at 69. Therefore, satisfactory and total cover would meet Forest Plan standards (minimum of 10 percent and 30 percent, respectively) for the Monument Winter Range. An HEI value of 69 is not consistent with Forest Plan standards for winter range habitat (HEI of at least 70). Because the existing (pre-treatment) value for HEI in the winter range is also 69, there would be no change from the existing condition; therefore, there would be no adverse impacts on elk habitat effectiveness in the analysis area.

All cumulative cover-related values are consistent with Forest Plan standards for the entire Monument Winter Range. In meeting the cover-related management direction for elk in the C3 management area, the Monument Winter Range would continue to provide sufficient cover habitat (total, satisfactory, and marginal), as well as continue to contribute to the elk population management objectives of the State of Oregon. While a habitat effectiveness index of 70 would not be achieved by implementation of the Sunflower Bacon project (not a purpose and need of the project), this project would not cumulatively reduce the index from its current level. When combined with other activities in the winter range, this alternative would cumulatively increase vulnerability of big game animals due to increased sight distances in treated stands. This increase in vulnerability would result in changes in distribution and the amount of time elk spend on National Forest System lands. Elk would likely spend more time on lower quality private lands where there are fewer disturbances year-round due to the extent of habitat modification in the analysis area.

#### Alternative 3

The cumulative effects are similar to those described under Alternative 2. This alternative would not reduce the amount of satisfactory or marginal cover in the winter range. This alternative would have the least impact on big game cover and vulnerability when compared to the other action alternatives. Based on the cumulative impacts of past, present, and future actions in the Monument Winter Range, satisfactory cover and total cover would be unchanged in the Monument Winter Range. HEI would also remain unchanged at 69. Therefore, satisfactory and total cover would meet Forest Plan standards (minimum of 10 percent and 30 percent, respectively) for the Monument Winter Range. An HEI value of 69 is not consistent with Forest Plan standards for winter range habitat (HEI of at least 70). Because the existing (pre-treatment) value for HEI in the winter range is also 69, there would be no change from the existing condition; therefore, there would be no adverse impacts on elk populations in the analysis area. Cumulatively, HEI would be unchanged in the winter range when combined with the effects of past, present, and future activities and events. When combined with other activities in the winter range, this alternative would cumulatively increase vulnerability of big game animals due to increased sight distances in treated stands. Because this alternative would treat the fewest acres of all of the action alternatives (and maintain high quality cover and security areas), there would be no adverse effect on elk populations or their distribution within the analysis area.

#### Alternative 4

The cumulative effects are similar to those described under Alternative 2. Based on the cumulative impacts of past, present, and future actions in the Monument Winter Range, satisfactory cover and HEI would be unchanged (10.2 percent and 69, respectively) in the Monument Winter Range. Total cover would be reduced to 42.5 percent following treatment. Therefore, satisfactory and total cover would meet Forest Plan standards (minimum of 10 percent and 30 percent, respectively) for the Monument Winter Range. An HEI value of 69 is not consistent with Forest Plan standards for winter range habitat (HEI of at least 70). Because the existing (pre-treatment) value for HEI in the winter range is also 69, there would be no change from the existing condition; therefore, there would be no adverse impacts on elk populations in the analysis area. Cumulatively, HEI would be unchanged in the winter range when combined with the effects of past, present, and future activities and events. When combined with other activities in the winter range, this alternative would cumulatively increase vulnerability of big game animals due to increased sight distances in treated stands. Because this alternative would maintain a portion of the available cover and security areas, there would be no adverse effect on elk populations or distribution within the analysis area.

## Primary Cavity Excavators - MIS

### *Current Condition*

Primary cavity excavators refers to 16 bird species on the Umatilla National Forest that create holes for nesting or roosting in live, dead, or decaying trees. Secondary cavity users such as owls, bluebirds, and flying squirrels may use cavities later for denning, roosting, and/or nesting. Primary cavity excavators (PCE) with the potential to occur on the Umatilla National Forest are listed in Table W-3 along with their preferred habitat type.

With the dry forest types dominating the Sunflower Bacon analysis area and the limited amount of moist forest types, 11 of the 16 primary cavity excavators have the potential to occur in the analysis area. These species include Lewis' woodpecker, red-napped sapsucker, Williamson's sapsucker, downy woodpecker, hairy woodpecker, white-headed woodpecker, northern flicker, mountain chickadee, red-breasted nuthatch, white-breasted nuthatch and pygmy nuthatch (Table W-3).

In general, habitat for primary cavity excavators consists of dead and/or dying trees in various size classes. Habitat can occur in a variety of vegetative communities with various structural conditions (Thomas 1979). In general, existing and potential habitat can be found throughout the analysis area, except for non-forest areas and forest stands in the process of regeneration (stand initiation, and stem exclusion). Habitat for primary cavity excavators will be evaluated in the *Dead Wood Habitat* section of this report.

Table W-3. Primary Cavity Excavators with a Potential to Occur in the Sunflower Bacon Analysis Area

| Common Name | Habitat Community[1, 2] | Nest Tree Size[2] |
|---|---|---|
| Lewis' woodpecker | Ponderosa pine, riparian cottonwood, oak woodland, and burned stands. | 13"– 43" DBH. |
| Red-napped sapsucker | Riparian cottonwood, aspen, conifer forests. Mid-high elevations. | 11" DBH. Avg. |
| Williamson's sapsucker | Mid-high elevation mature or old conifer forests (ponderosa pine, fir, lodgepole pine, etc.) with large dead trees present. | 27" DBH. Avg. |
| Downy woodpecker | Riparian cottonwood, willow, aspen, mixed deciduous, and mixed-conifer. | 8" DBH. Min. |
| Hairy woodpecker | Mixed conifer, ponderosa pine, and adjacent deciduous stands. | 17" DBH. Avg. |
| White-headed woodpecker | Open ponderosa pine or mixed conifer, dominated by ponderosa pine. | 26" DBH. Avg. |
| Northern flicker | All forest types with older open forests and edges adjacent to open country. | 22" DBH. Avg. |
| Mountain chickadee | Open canopy, ponderosa pine, lodgepole pine and other conifer forests. | 4" DBH. Min. |
| Red-breasted nuthatch | Coniferous forests with mid to late seral stages. | 12" DBH. Min. |
| White-breasted nuthatch | Mature ponderosa pine and mixed-conifer forest. Oak woodlands | 12" DBH. Min. |
| Pygmy nuthatch | Mature to old ponderosa pine or mixed conifer with ponderosa dominant. | 12" DBH. Min. |

[1] Based on Johnson and O'Neil 2001.

[2] From Thomas 1979, Ehrlich et al 1988, Degraaf 1991, and Marshall et al 2003.

### *Direct and Indirect Effects*

Primary cavity excavators will be analyzed in the Dead Wood Habitat portion of the effects section.

## Pileated Woodpecker - MIS

### *Current Condition*

Preferred habitat (foraging and nesting) for the pileated woodpecker includes dense moist forest types (mixed conifer) in late seral stages with a high density of dead/downed wood habitat (Marshall et al. 2003). The analysis area consists of 67% dry forest types. Dry forest types are not considered "suitable" habitat for the pileated woodpecker. Potential habitat (moist upland forest potential vegetation group) occurs on approximately 1.2% (238 acres) of the analysis area. Effects on the pileated woodpecker will be analyzed in the *Dead Wood Habitat* and *Late and Old Structure* sections of this report.

### Direct and Indirect Effects

The pileated woodpecker will be analyzed in the Dead Wood Habitat and the Late Old Structure portion of the effects section.

## Threatened, Endangered. Proposed, Candidate, and Sensitive Species

Federally “listed” species are identified by the U.S. Fish and Wildlife Service as endangered, threatened, proposed, or candidate species under the Endangered Species Act (USDI 1999 and 2001). Sensitive species are those recognized by the Pacific Northwest Regional Forester as needing special management to meet National Forest Management Act obligations and requirements (USDA 2004). Sensitive species addressed on the Umatilla National Forest include those that have been documented (valid, recorded observation) or suspected (likely to occur based on available habitat to support breeding pairs/groups) within or adjacent to the Forest. Federally listed and sensitive species with a potential to occur on the Umatilla National Forest are found in Table W-4.

Based on District records, surveys, and monitoring, as well as published literature about distribution and habitat utilization, regionally sensitive species with the potential to occur in the analysis area include the gray flycatcher, Columbia spotted frog, and upland sandpiper. No federally listed species are known to occur in the analysis area; however, due to the proximity of the analysis area to the Dry Creek bald eagle nest and the presence of suitable gray wolf habitat in the area, an analysis of the effects of the proposed activities on these species will also occur.

There will be no environmental effects analysis for the painted turtle, peregrine falcon, yellow-billed cuckoo, California wolverine, Canada lynx, or the Rocky Mountain bighorn sheep because suitable habitat for these species is not present in the analysis area. None of these species have been observed in or are currently known to occur in the analysis area.

| Table W-4. Threatened and Sensitive Species in the Sunflower Bacon Analysis Area | | | |
|---|---|---|---|
| Species | U.S Fish & Wildlife Service | Regional Forester's Sensitive Animals | Umatilla NF Occurrence[1] |
| Columbia spotted frog *Rana luteiventris* | - | Sensitive | D |
| Gray flycatcher *Empidonax wrightii* | - | Sensitive | S |
| Upland sandpiper *Bartramia longicauda* | - | Sensitive | S |
| Gray wolf *Canis lupus* | Threatened | - | S |
| Northern Bald Eagle *Haliaeetus leucocephalus* | Threatened | - | D |
| [1] S = Suspected, likely to occur based on habitat availability to support breeding pairs/groups within Forest boundary. D = Documented, reliable, recorded observation within the Forest boundary. | | | |

## Columbia Spotted Frog – Sensitive

### *Current Condition*

There have been no observations of the Columbia spotted frog in the analysis area; however, formal surveys for this species have not been done in the area. Potential habitat is present in the analysis area. Most of the streams in the analysis area do not provide potential breeding habitat for the frog due to their small size, tendency to dry up in the summer, and their rocky substrate. . If present in the analysis area, adult spotted frogs would use larger streams (Little Wall, Three Trough, Bacon, and Sunflower Creeks) during the summer. Perennial stock ponds in the analysis area would be considered suitable breeding habitat for the Columbia spotted frog.

### *Direct and Indirect Effects*

#### Alternative 1

The Columbia spotted frog would not be affected by implementation of this alternative. No ground disturbing activities would occur under this alternative. In the short and mid term, the quality of potential spotted frog habitat would stay the same. In the long term, continued development of riparian habitat would improve habitat quality for this species. Riparian areas would continue to recover from past disturbances, resulting in increased riparian shading (overstory and shrubs). In the long term, the risk of high severity wildfire would also increase due to continued multi-strata development and increasing fuel loads. A wildfire of this type would consume riparian vegetation used by the spotted frog for cover. A fire of this type would not alter the suitability of potential breeding habitat in the analysis area.

#### Alternative 2

This species is not currently known to occur in the analysis area. Nearly all treatment activities would occur outside of Riparian Habitat Conservation Areas with the exception of conifer removal from aspen unit 18; therefore, there would be no direct effects on this species. There is a chance that sediment could reach streams in the analysis area; however, sediment would not affect the quality of potential spotted frog habitat. Ponds (potential breeding habitat) and springs (over-wintering habitat) would also be buffered from treatment, so there would be no effect on these habitats. Proposed underburning would not adversely affect potential spotted frog habitat. Use of the existing road system and construction of temporary roads would not affect potential spotted frog habitat.

#### Alternative 3

Same as alternative 2

#### Alternative 4

Same as alternative 2

### *Cumulative Effects*

#### Alternative 2, 3, and 4

Past activities that affected potential spotted frog habitat include grazing, timber harvest, and pond construction. Past cattle grazing (sheep and cattle) affected potential habitat. Sheep grazing within the allotment during the early 1900's affected rangeland condition due to high stocking densities. Cattle grazing (beginning in 1967) has not occurred at high densities (>10 acres per head month) in the analysis area. Past timber harvest occurred within and adjacent to riparian habitat in the allotment. These activities resulted in sediment reaching streams, disturbance in riparian habitats, a reduction in stream shading, and reduced habitat quality. Created ponds (rock pits and cattle watering ponds) increased available breeding habitat for the spotted frog in upland areas. These past activities have combined to create the existing condition of potential spotted frog habitat in the analysis area.

Present activities in the allotment include fire suppression and livestock grazing. Overall, fire suppression activities have resulted in increased stand densities and downed wood in the analysis area. This has resulted in an increased chance of high severity wildfire. A high severity fire in the analysis area could result in the loss of vegetation and an increase in sediments in RHCAs. Cattle grazing is currently occurring at relatively low stocking rates within the analysis area. Cattle grazing is not adversely affecting potential spotted frog habitat in the analysis area.

Reasonably foreseeable future activities in the allotment include cattle grazing. Future cattle grazing is expected to have the same effects as those described above.

Based on the cumulative effects of past, present, and future actions within the analysis area, potential habitat for the spotted frog would not be adversely affected. The spotted frog is not known to occur in the analysis area. The proposed activities would not adversely affect potential habitat for the spotted frog.

#### Determination of Effects

Under any action alternative, there would be **No Impact** on the Columbia spotted frog or potential habitat. There would be no impact on this species for the following reasons:

- This species has not been observed in the analysis area, and is not known to occur on the Heppner Ranger District.
- Potential habitat quality would not be affected by the proposed activities.
- Ponds and streams would be buffered from vegetative treatments.
- Proposed underburning could occur in potential habitat within RHCAs; however, the intensity of proposed underburns (a combination of weather and fuel conditions/moisture) would not adversely impact potential habitat.

## Gray Flycatcher – Sensitive

### *Current Condition*

This species has not been observed in the analysis area or on the District. Within the analysis area, potential habitat for the gray flycatcher includes mature juniper woodland and upland shrubs (mahogany, bitterbrush, etc).

### *Direct and Indirect Effects*

#### Alternative 1

The gray flycatcher is not known to occur in the analysis area. Potential flycatcher habitat (open ponderosa pine with a shrub understory, juniper woodland, and upland shrubs) would remain unchanged in the short term. Over time, stands in the project area would continue to grow and develop into dense multi-story stands. The understory would primarily consist of sapling and seedling grand fir, Douglas-fir, and ponderosa pine, given current fire suppression activities. Shrubs would be less common in the long term due to competition with tree species. As a result, habitat in the project area would become unsuitable for the gray flycatcher. The multi-layer condition would increase the susceptibility of stands to high-intensity wildfires and insect or disease outbreaks. A major disturbance on the landscape would change the composition and structure to an open shrubland with little or no tree cover. Continued encroachment of juniper into forest and grassland habitats has the potential to improve habitat for this species in the long term.

#### Alternative 2

The gray flycatcher is not known to occur in the project area. All commercial and non-commercial thinning would occur outside potential gray flycatcher habitat. As a result, there would be no effect on potential gray flycatcher habitat.

Juniper thinning (407 acres) would indirectly affect potential habitat for the gray flycatcher by removing juniper in areas where it did not historically occur. Removal of juniper up to 14 inches dbh could reduce potential habitat in the analysis area; however, this activity would occur in areas where juniper did not historically occur. This activity would not affect upland shrubs (mahogany, bitterbrush, etc.) potentially used for nesting.

Burning has the potential to reduce the abundance of upland shrubs (mountain mahogany, bitterbrush, etc.) in potential gray flycatcher habitat. Due to the low intensity of proposed landscape underburns, the expected loss of shrubs is minimal. Existing mature and overmature juniper would not be affected by burning. Small diameter juniper (< 2 inches) could be killed by underburning.

#### Alternative 3

The environmental effects of this alternative would be similar to those described under Alternative 2. All commercial and non-commercial thinning would occur outside potential gray flycatcher habitat. As a result, there would be no effect on potential gray flycatcher habitat. Landscape underburning would have the same effects on potential gray flycatcher habitat as those described under Alternative 2. Existing mature and overmature juniper habitat would not be affected by burning. The fewest acres of landscape underburning would occur under this alternative.

Under this alternative, there would be approximately 312 acres of juniper thinning (95 fewer acres when compared to Alternative 2). Removal of juniper up to 14 inches dbh would affect the quantity of future potential habitat for the gray flycatcher.

#### Alternative 4

The environmental effects of this alternative would be similar to those described under Alternative 2. All commercial and non-commercial thinning would occur outside potential gray flycatcher habitat. As a result, there would be no effect on potential gray flycatcher habitat. Landscape underburning would have the same effects on potential gray flycatcher habitat as those described under Alternative 2. Existing mature and overmature juniper would not be affected by burning.

Under this alternative, there would be approximately 377 acres of juniper thinning (35 fewer acres when compared to Alternative 2). Removal of juniper up to 14 inches dbh would affect the quantity of future potential habitat for the gray flycatcher.

### *Cumulative Effect*

#### Alternative 2, 3, and 4

Past activities and events in the watershed that affected flycatcher habitat include fire suppression, livestock grazing, wildfire (280 acres), and prescribed underburning (8,217 acres). Fire suppression has allowed for the invasion of juniper into areas where it did not historically occur, increasing potential habitat in the analysis area. Livestock (sheep) grazing occurred at very high stocking levels in the past. Livestock grazing at these densities contributed to degradation of grassland and shrubland habitats, negatively affecting invertebrate communities that flycatchers depend upon. Natural wildfire enhances flycatcher habitat by encouraging shrub habitat that is important for flycatchers. Wildfires may have killed mature and overmature juniper required by this species. Low intensity underburning within the analysis area likely improved habitat for this species by improving grassland and shrubland condition. Past activities, actions, and events have combined to create the existing condition of potential gray flycatcher habitat in the analysis area.

Present activities in the watershed that are affecting the gray flycatcher and its habitat include fire suppression and livestock grazing. Decades of fire suppression have reshaped the landscape within the analysis area. Fire suppression has allowed juniper to encroach into upland shrub and grass-dominated habitats, reducing the total biomass of herbaceous cover, shrub cover, and overall plant diversity. Present livestock (cattle) grazing is not adversely affecting rangelands in the analysis area. Stocking levels are much lower than what historically occurred.

Future activities and events in the watershed that could have a cumulative effect on flycatcher habitat include grazing. The effects of this activity would be the same as those described under present activities.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be no effect on existing habitat for this species. Treatment would not reduce the amount of suitable gray flycatcher habitat in the analysis area; only small diameter juniper in areas that historically did not support juniper would be treated. Suitable habitat would not be affected by the proposed treatments there would be no adverse effect on this species or potential habitat.

#### Determination of Effects

Alternative 2, 3, and 4 **May Impact** individuals or habitat, but would not contribute to a trend toward federal listing or cause a loss of viability to the population or species. The reasons for this determination are as follows:

- The gray flycatcher has not been observed on the District and is not known to occur in the analysis area.
- Potential habitat may be affected by the proposed activities under this alternative.
- Juniper thinning would reduce the quantity of potential future habitat (foraging).
- Existing mature and overmature juniper in the analysis area would not be affected by the proposed activities.
- There is the potential that upland shrubs will be affected by burning. Mortality of existing upland shrub habitat during burning would reduce potential nesting and foraging habitat for the gray flycatcher. Regeneration of upland shrubs post fire would be slow due to wild ungulate and domestic livestock browsing.

## Upland Sandpiper – Sensitive

### *Current Condition*

Open grasslands providing potential habitat for this species are present along the 22, 21, and portions of the 2202 roads. These habitats are generally smaller than 1,000 acres; however, they have an appropriate vegetation composition and structure and would be considered suitable habitat for this species.

The upland sandpiper has not been observed in the analysis area or on the District. Observations of the species have occurred approximately 25 miles northeast of the analysis area near the town of Ukiah and Bridge Creek State Wildlife Area.

### *Direct and Indirect Effects*

#### Alternative 1

This species is not known to occur in the analysis area or on the District. The quality of potential upland sandpiper habitat would be maintained in the short and mid term. In the long term, continued invasion of conifer species into grasslands would reduce the quality of potential sandpiper habitat.

#### Alternative 2

The upland sandpiper is not known to occur in the analysis area or on the District. Commercial and non-commercial thinning would not affect potential sandpiper habitat because these activities would occur in forested habitats. Potential habitat would not be affected by landscape underburning. All open grassland habitats have been excluded from proposed burning units. If proposed underburns were to jump control lines, the quality of potential sandpiper habitat would not be adversely affected. If burning occurred in these areas, the previous year's growth of grasses would be consumed; the structure and composition of these habitats would not be adversely affected.

#### Alternative 3

Same as alternative 2

#### Alternative 4

Same as alternative 2

### *Cumulative Effect*

Because the project would have no effect on the upland sandpiper there will be no cumulative effect.

#### Determination of Effects on the Upland Sandpiper

Alternatives 2, 3, and 4 would have **No Impact** on the upland sandpiper for the following reasons:

- This species has not been observed in the analysis area or on the District.
- Proposed vegetative treatments and burning would occur completely outside of potential sandpiper habitat, so there would be no effect on potential habitat.
- If prescribed under burns jumped control lines, the quality of potential habitat would not be adversely affected. If potential habitat were to burn, the previous year's growth of grasses would be consumed; new growth would be stimulated following burning.

## Gray Wolf – Threatened

### *Current Condition*

Habitat for this species occurs throughout the Umatilla National Forest and the analysis area. Habitat quality is considered good because of the low open road densities (1.2 miles per square mile) and moderate ungulate populations. Gray wolf could occur in the Sunflower Bacon analysis area, although use has not been documented.

A radio-collared gray wolf dispersed to the Blue Mountains from Idaho in March 1999, and was captured approximately 20 miles southeast of the analysis area and relocated to Idaho (Cody 1999). In October 2000, a wolf was killed along US Highway 395, north of Ukiah. Also in 2000, a gray wolf was struck along Interstate 84 west of Baker City, Oregon. Numerous unconfirmed sightings of gray wolves have occurred on the Forest in the past several years. The nearest sighting to the analysis area occurred approximately 6 miles west of the analysis area along Highway 207. The Idaho wolf population has been increasing steadily, and dispersal into the Blue Mountains is expected to continue in the future.

### *Direct and Indirect Effects*

#### Alternative 1

The gray wolf is not known to occur in the analysis area. There would be no adverse effect on potential gray wolf habitat because open road densities are expected to remain 1.2 miles per square mile within the analysis area. In the Monument winter range, open road density is expected to remain 0.5 miles per square mile. Openings for potential natal dens or rendezvous sites may experience some conifer encroachment over time; however, the size or number of these openings would not be significantly reduced. Big game populations (prey) are expected to remain stable or slightly decrease (see Rocky Mountain elk discussion) in the short term. Big game populations would be adequate to support potential gray wolf in the area in the short and long term.

#### Alternative 2

Commercial and non-commercial thinning and burning activities would not adversely affect potential gray wolf habitat; wolves are generalists, therefore reductions in cover or other effects of vegetative treatments would not alter the suitability of potential habitat for the gray wolf. Thinning and burning activities would alter habitat for potential prey of the gray wolf. Treatment within the Monument winter range would have no effect on the existing HEI in the analysis area. Satisfactory and marginal cover habitats would be converted to forage and lower quality cover habitat under this alternative (see *Rocky Mountain Elk* section). Thinning would reduce stand densities in cover habitat, increasing elk vulnerability to hunting. It is unlikely that there would be a measurable change in existing populations in response to treatment, although the distribution of elk within the analysis area may change. Due to the expected effects of this alternative on forested cover within the analysis area, elk may avoid thinned stands, especially where close to open roads. Opening up the overstory and reducing the understory through thinning or burning would result in an increased production of grasses and forbs for elk foraging.

The proposed activities would decrease the chance of a high severity wildfire in the analysis area, maintaining a mosaic of cover and forage habitat across the analysis area.

Construction of temporary roads and opening closed roads during treatment would temporarily increase human disturbance in the analysis area. These effects on road density would be temporary because temporary roads would be decommissioned following completion of harvest and burning activities. All closed roads used during treatment activities would be closed again after activities are completed.

#### Alternative 3

This alternative would have effects similar to those described under Alternative 2. There would be no effect on potential gray wolf habitat under this alternative. This alternative would have the least impact on habitat for potential prey species of the wolf. Under this alternative, there would be no conversion of satisfactory or marginal cover to lower quality cover or forage habitat. As was the case with Alternative 2, HEI within the Monument winter range would be maintained at 69 under this alternative. Satisfactory habitat, a portion of the marginal habitat, and several large blocks of habitat would not be treated to maintain hiding cover and security areas for big game. In those stands that would be commercially and non-commercially harvested, big game vulnerability would increase due to increased sight distances; elk may spend less time in thinned stands, especially where they are adjacent to open roads.

The existing open road density in the analysis area (1.2 miles per square mile) would be maintained under this alternative. Although it does not measurably affect road density in the analysis area, approximately 1.1 miles of open road within the Monument winter range would be closed under this alternative.

#### Alternative 4

This alternative would have effects similar to those described under Alternative 2. There would be no effects on potential gray wolf habitat under this alternative. Under this alternative there would be no loss or conversion of satisfactory cover habitats; these habitats would not be treated. Several large blocks of habitat in the eastern portion of the analysis area would not be treated to maintain hiding cover and security areas for big game. As was the case with Alternative 2, HEI within the Monument Winter Range would be maintained at 69 under this alternative. In those stands that would be commercially and non-commercially thinned, big game vulnerability would increase due to increased sight distances; elk may spend less time in thinned stands, especially where they are adjacent to open roads.

Open road density would remain the same under this alternative. After completion of treatment activities, the open road density in the analysis area would be 1.2 miles per square mile. Approximately 1.1 miles of open road would be closed under this alternative.

### *Cumulative Effect*

#### Alternative 2, 3, and 4

Because the project would have no effect on the upland sandpiper there would be no cumulative effect.

#### Determination of Effects on the gray wolf

Alternatives 2, 3, and 4 would have **No Effect** on the gray wolf or potential habitat for the following reasons:

- The gray wolf is not currently known to occupy the Forest or District.
- No denning or rendezvous sites have been identified on the District.
- There would be no increase in road density (human disturbance) in the analysis area under this alternative.
- Habitat effectiveness for prey would be maintained at current levels in the Monument winter range and decrease slightly in the E1 management area. An adequate prey base would be maintained within the analysis area to support potential gray wolf.

## Northern Bald Eagle – Threatened

### *Current Condition*

Bald eagle wintering habitat is present approximately six miles southeast of the analysis area along the North Fork John Day River. Wintering bald eagles are commonly noted along the river between the months of November and March. No observations of the bald eagle have occurred in the analysis area, although they may pass through the area infrequently during the winter and early spring. No potential nesting habitat is present in the analysis area; streams within the analysis area are too small to support an adequate food supply during the breeding season.

An active bald eagle nest was discovered on the District in May 1994. The Dry Creek bald eagle nest is located approximately seven miles south of the analysis area near Ant Hill Lookout. This is the only known active northern bald eagle nest on the Umatilla National Forest, and is one of three recently occupied bald eagle nest sites in the Blue Mountains. The nest is located approximately three miles north of the North Fork John Day River. A site-specific management plan was prepared for this nest site in 1999. It identified geographical areas of consideration and other factors that should be considered during project development. This nest has fledged young in 8 of the 12 years since it was discovered.

## Direct and Indirect Effects

### Alternative 1

No timber harvest or other ground disturbing activities would occur under this alternative; therefore, there will be no effect on this species. Wintering bald eagles have not been observed in the analysis area. Suitable wintering and nesting habitat is not present in the analysis area.

### Alternative 2

Bald eagles have not been observed in the analysis area. All of the proposed treatment units are outside of the Bald Eagle Consideration Area (BECA) identified in the site-specific management plan for the Dry Creek bald eagle nest (Van Winkle 1999). The closest treatment unit to the Dry Creek bald eagle nest is approximately 7 miles away. Harvest activities in the analysis area would not disturb nesting activities at this site due to the distance that separates the two. Snags would be minimally affected by the proposed activities. The few snags that would be lost to harvest operations would not adversely impact potential roosting habitat for bald eagle, if they made a foray into the analysis area.

### Alternative 3

Same as alternative 2

### Alternative 4

Same as alternative 2

## Cumulative Effect

Because the project would have no effect on the Bald Eagle there would be no cumulative effect.

### Determination of Effects on the Bald Eagle

Alternative 2, 3, and 4 would have **No Effect** on the bald eagle for the following reasons:

- Bald eagles have not been observed in the analysis area.
- Potential habitat (roosting/nesting) quality would not be affected through implementation of this alternative. No suitable nesting habitat is present in the analysis area.
- Bald eagle would not be disturbed by the sight or sound of the proposed activities due to the distance that separates the nest from the proposed activities.

Table W-5 summarizes the determination of effects for all Proposed, Threatened, Endangered, and Sensitive terrestrial wildlife species considered in this analysis.

Table W-5. Determinations for Proposed, Threatened, Endangered, and Sensitive terrestrial wildlife species in the Sunflower Bacon Analysis Area.

| Species | Determination of Effects | | |
|---|---|---|---|
| | Alternative 1 | Alternative 2 | Alternative 3 |
| Columbia spotted frog *Rana luteiventris* | NI | NI | NI |
| Gray flycatcher *Empidonax wrightii* | MIIH | MIIH | MIIH |
| Upland sandpiper *Bartramia longicauda* | NI | NI | NI |
| Gray wolf *Canis lupus* | NE | NE | NE |
| Northern Bald Eagle *Haliaeetus leucocephalus* | NE | NE | NE |

NI – No Impact; NE – No Effect, MIIH – May Impact individuals or habitat, but would not contribute to a trend towards federal listing or cause a loss of viability to the population or species.

## Species of Interest

These are species that are “of interest” to the public at the local or regional level, or were identified as a species of concern by the Fish and Wildlife Service. Many of these species are considered uncommon or their status is unknown in the Pacific Northwest. Table W-6 lists the species of interest that could occur, based on observations or the presence of potential habitat in the analysis area.

Table W-6. Species of Interest in the Sunflower Bacon Analysis Area

| Common Name | Scientific Name | Oregon Status (1998) |
|---|---|---|
| Northern goshawk | *Accipiter gentilis* | Sensitive-Critical |
| Olive-sided flycatcher | *Contopus cooperi* | Sensitive-Vulnerable |
| White-headed woodpecker | *Picoides albolarvatus* | Sensitive-Critical |
| Lewis’ woodpecker | *Melanerpes lewis* | Sensitive-Critical |
| Long-eared myotis | *Myotis evotis* | Sensitive-Undetermined Status |
| Long-legged myotis | *Myotis volans* | Sensitive-Undetermined Status |
| Yuma myotis | *Myotis yumanensis* | None |

## Northern Goshawk

### *Current Condition*

Potential foraging and nesting habitat is present in the analysis area. There are approximately 2,566 acres of potential nesting habitat and 8,833 acres of potential foraging habitat in the analysis area (queried from GIS database). The analysis area provides a mosaic of structural stages, creating microhabitats for prey species. Recent research (Greenwald et al. 2005) indicates that goshawk tend to avoid young early seral stands and stands with less than 40% canopy closure. Queries of potential nesting and foraging habitat used 40% canopy closure as the lower extent for suitable habitat and excluded stand initiation structural stages from potential foraging habitat. The northern goshawk has been observed (a single observation) in the Sunflower Bacon analysis area (Heppner Ranger District Wildlife Database). Nest stands have not been observed in the analysis area. A survey in June 2005 found no goshawk in the area of the recorded goshawk sighting. Other potential habitat was surveyed using a recording of distress and begging calls, but no response was elicited.

## *Direct and Indirect Effects*

### Alternative 1

The goshawk would not be directly affected by current management direction because there would be no ground disturbing activities under this alternative. Potential nesting and foraging habitat would remain unchanged in the short term. Over time, stands would continue to grow and develop into dense multistory stands. Young stands would develop large trees over time, filling openings created by past harvest. As a result, the availability of nesting habitat would increase due to a greater abundance of large trees and dense late and old structure habitat. However, foraging habitat would be reduced as the area grows denser and more homogenous, resulting in fewer microhabitats for prey species. The multi-layer condition would increase the susceptibility of stands to high-intensity wildfires and insect or disease outbreaks. A major disturbance on the landscape would change the composition and structure to an open shrubland/grassland with little or no tree cover. This would result in fewer large trees and decreased stand density/canopy closure.

### Alternative 2

Commercial thinning would occur on approximately 451 acres of potential goshawk nesting habitat under this alternative. An additional 260 acres would be non-commercially thinned; overstory vegetation and canopy closure would not be affected by non-commercial thinning, therefore, non-commercially thinned stands would continue to provide potential nesting habitat immediately following treatment and in the long term. Commercial thinning would reduce overstory canopy closure in treated stands by removing smaller trees and tree species uncharacteristic of the dry upland forest potential vegetation group. Approximately 250 acres would fall below 40% canopy closure (threshold level in Greenwald et al. (2005)) following treatment; in the short term, these stands would not be used for nesting or foraging. In the long term, canopy closure would increase, and these stands would be considered potential nesting and foraging habitat. In the mid and long term, proposed activities would improve potential northern goshawk habitat in the analysis area by retaining the largest trees in treated stands and all live trees 21 inches in diameter at breast height or larger. Treated stands would be moved toward a late and old structural condition. In the event that a northern goshawk nest is discovered in the project area, treatments would be adjusted to meet the guidelines provided in the “Eastside Screens” (USDA 1995).

Approximately 2,497 acres of potential foraging habitat would be treated under this alternative. Approximately 521 acres of this total would be non-commercially thinned. Non-commercially thinned stands would maintain existing canopy closure; only understory vegetation would be affected. Reductions in understory vegetation could improve hunting efficiency of goshawk. Canopy closure would be reduced below 40% on approximately 1,316 acres within the analysis area. According to

Greenwald et al. (2005), existing research suggests that goshawk would avoid these areas due to low canopy closure.  On the remainder of the potential foraging habitat affected by this alternative (those acres that would meet or exceed 40% canopy closure), goshawk may temporarily avoid these habitats during implementation due to noise and disturbance, but would use these habitats after completion of treatment activities.

### Alternative 3

The effects of this alternative would be similar to those described under Alternative 2.  Commercial thinning would occur on approximately 344 acres of potential goshawk nesting habitat under this alternative.  An additional 260 acres would be non-commercially thinned; overstory vegetation and canopy closure would not be affected by non-commercial thinning, therefore, non-commercially thinned stands would continue to provide potential nesting habitat immediately following treatment and in the long term.  Commercial thinning would reduce overstory canopy closure in treated stands by removing smaller overstory trees and tree species uncharacteristic of the dry upland forest potential vegetation group.  Approximately 210 acres of nesting habitat would fall below 40% canopy closure (threshold level in Greenwald et al. (2005)) following treatment; in the short term, these stands would not be used for nesting or foraging.  In the long term, canopy closure would increase, and these stands would be considered potential nesting and foraging habitat.  Treated stands would be moved toward a late and old structural condition in the future.  The largest trees in treatment stands would be retained.  If a northern goshawk nest is discovered in the project area, the proposed activity would be adjusted to meet the guidelines provided in the “Eastside Screens” (USDA 1995).

Approximately 1,702 acres of potential foraging habitat would be treated under this alternative.  Approximately 498 acres of this total would be non-commercially thinned.  Non-commercially thinned stands would maintain existing canopy closure; only understory vegetation would be affected.  Canopy closure would be reduced below 40% on approximately 807 acres within the analysis area.  According to Greenwald et al. (2005), existing research suggests that goshawk would avoid these areas due to low canopy closure.  On the remainder of the potential foraging habitat affected by this alternative (those acres that would meet or exceed 40% canopy closure), goshawk may temporarily avoid these habitats during implementation due to noise and disturbance, but would use these habitats for foraging immediately after completion of treatment activities.

### Alternative 4

The effects of this alternative would be similar to those described under Alternative 2.  Commercial thinning would occur on approximately 399 acres of potential goshawk nesting habitat under this alternative.  An additional 260 acres would be non-commercially thinned; overstory vegetation and canopy closure would not be affected by non-commercial thinning, therefore, non-commercially thinned stands would continue to provide potential nesting habitat immediately following treatment and in the long term.  Commercial thinning would reduce overstory canopy closure in treated stands by removing smaller Overstory trees and tree species uncharacteristic of the dry upland forest potential vegetation group.  Approximately 246 acres (including variable density thinning acres-see discussion below) of nesting habitat would fall below 40% canopy closure (threshold level in Greenwald et al. (2005)) following treatment; in the short term, these stands would not be used for nesting or foraging.  In the long term, canopy closure would increase, and these stands would be considered potential nesting and foraging habitat.  Treated stands would be moved toward a late and old structural condition in the future.  The largest trees in treatment stands would be retained.  If a northern goshawk nest is discovered in the project area, the proposed activity would be adjusted to meet the guidelines provided in the “Eastside Screens” (USDA 1995).

Approximately 2,111 acres of potential foraging habitat would be treated under this alternative. Approximately 521 acres of this total would be non-commercially thinned. Non-commercially thinned stands would maintain existing canopy closure; only understory vegetation would be affected. Canopy closure would be reduced below 40% on approximately 1,102 acres (including variable density thinning acres-see discussion below) within the analysis area. According to Greenwald et al. (2005), existing research suggests that goshawk would avoid these areas due to low canopy closure. On the remainder of the potential foraging habitat affected by this alternative (those acres that would meet or exceed 40% canopy closure), goshawk may temporarily avoid these habitats during implementation due to noise and disturbance, but would use these habitats for foraging immediately after completion of treatment activities.

Approximately 55 acres of potential nesting habitat and 408 acres of potential foraging habitat would be treated with a variable density thinning prescription. Although these units would be below 40% canopy closure overall, pockets of more dense timber ranging in size from ¼ to ½ an acre in size would be maintained. These dense pockets of vegetation would provide potential nesting and foraging habitat for the northern goshawk.

## *Cumulative Effects*

### Alternative 2

Past activities and events in the watershed that would cumulatively affect goshawk habitat include timber harvest (25,842 acres), wildfire (280 acres), prescribed burns (8,217 acres), and private-land harvesting (approximately 1,000 acres of recent harvest). These activities have created a patchwork of structural stages across the landscape, increasing foraging areas for goshawk. Past harvest has reduced old forest structural stages and overstory canopy closure desired for nesting. Wildfire and prescribed burning have aided in the maintenance of a mosaic of stand structures in goshawk foraging habitat. Past activities have resulted in the current condition of potential habitat in the analysis area.

Present activities in the analysis area with the potential to affect this species include fire suppression. Fire suppression has contributed to changes in stand structure and composition across the analysis area. This activity has encouraged the development of dense multi-strata stands preferred for nesting.

Future fire suppression would have the same effects as those that are currently occurring in the analysis area.

Based on the cumulative effects of past, present, and future actions in the analysis area, potential goshawk nesting habitat (based on overstory canopy closure and stand structure) would be reduced by 10% and potential foraging habitat reduced by 15%. Late and old structure (single-stratum) characteristics would be promoted on treated acres. Treatments are consistent with the Forest Plan, which gives direction to maintain sufficient old growth forest to provide habitat for species that depend on or heavily use old growth habitats. A 15% reduction in potential habitat in the analysis area would not adversely affect the goshawk because these habitats are considered marginal. The affected areas are generally in dry forest habitat, which historically (prior to fire suppression) did not support stands with canopy closure suitable for this species.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. Based on the cumulative effects of past, present, and future actions in the analysis area, potential goshawk nesting habitat (based on overstory canopy closure and stand structure) would be reduced by 8% and potential foraging habitat reduced by 9% under this alternative. Affected stands are generally marginally suitable for the goshawk.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. Based on the cumulative effects of past, present, and future actions in the analysis area, potential goshawk nesting habitat (based on overstory canopy closure and stand structure) would be reduced by 10% and potential foraging habitat reduced by 12% under this alternative. Affected stands are generally marginally suitable for the goshawk.

## Olive-sided Flycatcher

### *Current Condition*

Preferred habitat for this species is present in the analysis area. Preferred habitat occurs in riparian corridors within the analysis area. The species has not been documented in the analysis area; it is presumed present because preferred habitat is present in the analysis area.

### *Direct and Indirect Effects*

#### Alternative 1

In the short term, the quality of habitat for the olive-sided flycatcher would not change; vegetative communities would continue to grow and develop under existing successional pathways. In the mid and long term, riparian communities would continue to develop; canopy closure would increase and stands would develop late and old structure characteristics. In the absence of management activities, remnant aspen stands would continue to decline, and eventually die out in the analysis area due to competition with conifers and a lack of recruitment. High severity wildfire (resulting from increased fuel loading and changes in stand composition and structure) would create edge habitat and large diameter snags, potentially used as perches by this species. Late and old structure riparian habitat would be burned over, reducing the quality of these areas for the olive-sided flycatcher.

#### Alternative 2

The olive-sided flycatcher is not known to occur in the analysis area. Under this alternative, there would be no harvest activities in riparian corridors. Potential habitat quality in late and old structure riparian habitat would not be affected by the proposed activities because no treatment activities would occur in Riparian Habitat Conservation Areas. Treatment of conifers in aspen stands would have a beneficial effect on foraging habitat by stimulating growth in suppressed stands of aspen.

#### Alternative 3

Same as alternative 2

#### Alternative 4

Same as alternative 2

### *Cumulative Effects*

#### Alternative 2, 3, and 4

Because potential habitat for this species would not be directly or indirectly affected, there would be no adverse effects on this species, if present in the analysis area.

## White-headed Woodpecker

### *Current Condition*

The white-headed woodpecker is present on the Heppner Ranger District. Suitable habitat is present in the analysis area. Fire suppression and encroachment of shade tolerant and fire intolerant tree species have reduced the quantity and quality of white-headed woodpecker habitat in the analysis area.

### *Direct and Indirect Effects*

#### Alternative 1

Implementation of this alternative would have no impact on this species or its habitat because there would be no harvest or other ground disturbing activities under this alternative. Potential nest snags would be recruited and lost (through decay and falling down) at existing rates in the short and mid term. Given continued fire suppression, shade tolerant and fire intolerant tree species would continue to encroach into historically open ponderosa pine habitats, reducing potential habitat quality. In the mid and long term, the risk of high severity wildfire would increase due to increased stand densities and fuel loading. A fire of this type would result in heavy overstory mortality and consume a portion of existing snags (and create many others). A series of wildfires would likely reduce snag densities below Forest Plan Standards. Under these circumstances, it would take 60 to 100 years to produce suitable foraging habitat for the white-headed woodpecker.

#### Alternative 2

Under this alternative, commercial harvest would occur on 2,456 acres. Residual stands would be composed of a greater proportion of ponderosa pine, the species preferred by the white-headed woodpecker for nesting and foraging. Reduced stand densities would have the added benefit of increasing growth rates; residual trees would reach a size that could be utilized by this species in a shorter amount of time than in non-treated stands. In the mid and long term, the quality of potential white-headed woodpecker habitat would be improved by treatment; treated stands would move toward an old forest single-strata structure dominated by ponderosa pine, the preferred habitat for the white-headed woodpecker.

There is a potential that snags may be felled in treatment units to provide for safety and allow access to harvest units. Commercial harvest would target green trees; snags would not be targeted for removal in harvest units. Given the equipment that would be used during harvest operations, the loss of snags within harvest units (and along haul routes where hazard trees would be felled) is expected to be minor. Forest Plan Standards for snag densities would continue to be met following harvest in both the Sunflower Bacon analysis area and the snag analysis area (Wall Creek watershed).

#### Alternative 3

The fewest acres of old forest single-strata (ponderosa pine) restoration/enhancement would occur under this alternative, so the potential long term benefit to the white-headed woodpecker and its habitat would be the lowest under this alternative.

#### Alternative 4

An intermediate number of acres would be treated to promote old forest single-strata (ponderosa pine) habitat under this alternative; the potential long-term benefit to the white-headed woodpecker would be intermediate when compared to the other action alternatives. Alternative 4 would retain dense patches of trees to maintain big game hiding cover in stands with variable density thinning prescriptions. These dense patches of timber would maintain a mosaic patchwork of stand structures and promote locally high insect populations that would create snags for potential nesting and foraging sites.

### *Cumulative Effects*

#### Alternative 2

Past activities, actions, and events that affected the white-headed woodpecker and its habitat include timber harvest, fire suppression, wildfire, and insect infestations. Past timber harvest on National Forest System lands (25,842 acres) and private lands (approximately 1,000 acres of recent harvest) targeted large diameter ponderosa pine trees this species is dependent on for foraging and nesting. Fire suppression has allowed for the encroachment of fire-intolerant conifer species into historically open ponderosa pine stands. The composition and structure of dry forest habitat has changed in response to fire suppression; the quality of these stands for white-headed woodpecker has declined. Fire suppression has increased the risk of high severity wildfire in the analysis area. A fire of this type could convert forested stands to a grassland condition with little to no overstory. Insect infestations resulting from overstocked stands have caused overstory mortality in portions of the analysis area. In some areas, Tussock moth killed 100 percent of the overstory during an outbreak in 2000-2001. In the short term, this event resulted in an increase in foraging and nesting habitat for the white-headed woodpecker. In the long term, there would be a shortage of large diameter snags and green trees.

Ongoing (present) activities in the analysis area that are affecting white-headed woodpecker or its habitat include fire suppression. This activity is having the same effects as those described previously.

Future activities with a potential to affect this species or its habitat include hazard tree felling and fire suppression. Hazard tree felling would occur along open forest roads under the Southern Hazard Tree Salvage Project. Over the entire Southern Project area, approximately 350 trees have been identified for removal. Due to the relatively small number of trees and snags that would be affected, it is unlikely that the white-headed woodpecker would be affected. Fire suppression would have the same effects as described previously. Overall, the proposed activities would have a beneficial effect on white-headed woodpecker habitat in the mid and long term.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be a slight reduction in snag densities within the project area due to hazard tree felling. The magnitude of this change is expected to be minor; Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed. In the mid and long term, the Sunflower Bacon project would have a positive impact on the quantity and quality of white-headed woodpecker habitat.

#### Alternative 3

The cumulative effects of this alternative are similar to those described under Alternative 2. This alternative would treat the fewest acres of potential white-headed woodpecker habitat in the analysis area.  Fewer acres of treatment would result in fewer acres of habitat restoration/enhancement of potential white-headed woodpecker habitat.  Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed under this alternative.  In the mid and long term, this alternative would have a positive impact on the quantity and quality of white-headed woodpecker habitat in the analysis area.

#### Alternative 4

The cumulative effects of this alternative are similar to those described under Alternative 2.  This alternative would have an intermediate effect on potential white-headed woodpecker habitat.  Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed.  In the mid and long term, the Sunflower Bacon project would have a positive impact on the quantity and quality of white-headed woodpecker habitat in the analysis area.

## Lewis' Woodpecker

### *Current Condition*

The Lewis' woodpecker has not been observed in the analysis area; however, observations have occurred near the boundary of the analysis area.

### *Direct and Indirect Effects*

#### Alternative 1

Implementation of this alternative would have no impact on this species or its habitat because there would be no harvest or other ground disturbing activities.  Potential nest snags would be recruited and lost (through insect and disease activity, decay, and falling down) at existing rates.  Given continued fire suppression, shade tolerant and fire intolerant tree species would continue to encroach into historically open ponderosa pine habitats, reducing potential foraging and nesting habitat quality.  High severity wildfire would create foraging and nesting habitat for this species.

#### Alternative 2

Under this alternative, commercial harvest would occur on 2,456 acres within the analysis area.  There is a potential that snags could be affected on commercially harvested acres to provided for safety, and allow access to harvest units.  It is expected that effects on snag densities would be minor, and would not limit the availability of snags for foraging and nesting (see *Standing Dead Wood [Snag]* section).  Conversely, treatment would leave a residual stand composed of a greater proportion of ponderosa pine.  Reduced stand densities would have the added benefit of increasing growth rates; residual trees would reach a size that could be utilized by this species in a shorter amount of time than in untreated stands.  In the long term, habitat suitability would be improved in the analysis area by commercial thinning that promotes the development of late and old structure, single-strata ponderosa pine habitat.

#### Alternative 3

This alternative would have similar effects as Alternative 2.  The potential loss of snags in the analysis area would be minor, and would not adversely affect this species or the suitability of habitat within the analysis area.  In the long term, habitat suitability would be improved in the analysis area by commercial thinning that promotes the development of late and old structure, single-strata ponderosa pine habitat.  Appropriate stand structure and composition for the Lewis' woodpecker would be restored or enhanced on the fewest acres under this alternative.

#### Alternative 4

This alternative would have similar effects as Alternative 2.

Alternative 4 would preserve dense patches of trees in variable density thinning units. These dense patches of timber would maintain a mosaic patchwork of stand structures and promote, locally, high insect populations that would create snags for potential nesting and foraging in the future.

### *Cumulative Effects*

#### Alternative 2

Past activities, actions, and events that affected the Lewis' woodpecker and its habitat include timber harvest, fire suppression, wildfire, personal use firewood cutting, and insect infestations. Past timber harvest on National Forest System lands (25,842 acres) and private lands (approximately 1,000 acres of recent harvest) targeted large diameter ponderosa pine trees this species prefers for foraging and nesting. Fire suppression has allowed for the encroachment of fire-intolerant conifer species into historically open ponderosa pine stands. Fire suppression has increased the risk of high severity wildfire in the analysis area. A fire of this type could convert forested stands to a grassland condition with little to no overstory. Firewood cutting occurs within 300 feet of open forest roads. This activity reduces snag densities (<24 inches dbh) adjacent to open roads in the analysis area. Insect infestations resulting from overstocked stands have caused overstory mortality in portions of the analysis area. In some areas, tussock moth killed 100 percent of the overstory during an outbreak in 2000-2001. Increased snag densities are having a beneficial effect on habitat for this species.

Ongoing (present) activities in the analysis area that are affecting the Lewis' woodpecker or its habitat include fire suppression and wood cutting. This activity is having the same effects as those described previously. Woodcutting would have the same effects as those described previously.

Future activities with a potential to affect this species or its habitat include hazard tree felling and fire suppression. Hazard tree felling would occur along open forest roads under the Southern Hazard Tree Salvage Project. Over the entire Southern Project area, approximately 350 trees have been identified for removal. Due to the relatively small number of trees and snags that would be affected, it is unlikely that the Lewis' woodpecker would be affected. Fire suppression would have the same effects as described previously.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be a slight reduction in snag densities within the project area due to hazard tree felling. The magnitude of this change is expected to be minor; Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed. In the mid and long term, this alternative would have a positive impact on the quantity and quality of Lewis' woodpecker habitat in the analysis area.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. This alternative would treat the fewest acres of all 3 action alternatives. Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed under this alternative; therefore, there would be no adverse effects on potential habitat for this species. In the mid and long term, this alternative would have a positive impact on the quantity and quality of Lewis' woodpecker habitat in the analysis area.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. This alternative would treat an intermediate number of acres in the analysis area. Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed under this alternative; therefore, there would be no adverse effects on potential habitat for this species. In the mid and long term, this alternative would have a positive impact on the quantity and quality of Lewis' woodpecker habitat in the analysis area.

## Bats of Interest

### *Current Condition*

The following species will be assessed as a group and not individually: long-eared myotis, long-legged myotis and Yuma myotis.

Potential roost habitat (large-diameter snags with exfoliating bark) for forest bats occurs within the analysis area. In general, bats have not been specifically surveyed (mist-net or bat detection devices) within the analysis area. Although some bats may be more rare in the Blue Mountains than others, some species have the potential to occur in the project area.

### *Direct and Indirect Effects*

#### Alternative 1

The forest bats of interest (long-eared myotis, long-legged myotis and Yuma myotis) would not be directly affected by current management direction because potential roosting habitat (large snags with exfoliating bark) would remain unchanged in the project area in the short term. Over time, stands in the project area would continue to grow and develop into dense multistory stands. As a result, potential roosting habitat would essentially remain unchanged because of the continued presence of large diameter snags in the project area. However, the multi-layer condition would increase the susceptibility of stands to high-intensity wildfires and insect or disease outbreaks. A major disturbance on the landscape would change the composition and structure to an open shrubland/grassland with little or no tree cover. This would result in fewer large green trees and typically an abundance of large snags for a twenty- to thirty-year period. In the long term, a severe wildfire would result in reduced roosting habitat due to natural decay and fall of large diameter fire-created snags. As a result, roosting habitat would be limited in the analysis area.

#### Alternative 2

No suitable hibernacula (hibernating habitat) or colonial roosting habitats are known to occur within the analysis area. Approximately 2,456 acres would be commercially thinned under this alternative. Snags would not be targeted for removal in the vast majority of the analysis area. Felling of snags would be incidental to green-tree harvest in commercial thinning units. Dead trees would be targeted for removal in portions of Units 56 and 57, where salvage of tussock-moth killed trees would occur. Overall, the potential reduction in snags is expected to be minor at the watershed and analysis area scale (see *Standing Dead Wood [Snags]* section). Forest Plan standards for snag density would continue to be met within treated stands. In salvage portions of Units 56 and 57, at least 4 snags per acre (2 $\geq$ 10 inches dbh and 2 ≥ 20 inches dbh) would be retained. Salvage would reduce potential future roosting habitat; removal of recently killed snags would not impact existing roosting habitat because there has been insufficient time for bark to loosen on dead trees. It is not expected that the proposed activities would adversely impact existing or future roosting habitat or populations due to the expected low level of impact on snag densities at the watershed scale.

#### Alternative 3

Same as alternative 2

#### Alternative 4

Same as alternative 2

### *Cumulative Effects*

#### Alternative 2

Past activities and events in the watershed that would cumulatively affect bat habitat include timber harvest, private land harvest, insect infestations, and personal use firewood cutting. Timber harvest altered stand structure and composition and removed a portion of the large green trees and snags within the affected areas. Recent insect infestations have resulted from changes in stand composition, structure, and density. Infestations have resulted in the creation of numerous snags in all size classes within a portion of the analysis area. Personal use firewood cutting reduced densities of large snags in the analysis area, especially close to open roads. Large snags (>24 inches dbh) are protected from woodcutting. These activities have resulted in the current habitat condition for bats in the analysis area.

Present activities and events in the watershed that affect bat habitat include personal use firewood cutting. This activity would have the same effects as those described in the past activities section.

Future activities with a potential to affect bat habitat include personal use firewood cutting and the Southern Hazard Tree Salvage Project. The Southern project would remove danger trees along open roads. Some of the snags identified for removal may provide potential habitat for forest-dwelling bats (large diameter with exfoliating bark). This project would affect a relatively small number of snags over the entire project area.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be a slight reduction in snag densities within the project area due to hazard tree felling. The magnitude of this change is expected to be minor; Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed following treatment. Therefore, there would be no adverse effect on potential roosting habitat or potential populations.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. The impact on snags would be the least under this alternative due to the number of acres treated. Forest Plan standards for snags would continue to be met in the analysis area and in the Wall Creek watershed following treatment. Therefore, there would be no adverse effect on potential roosting habitat or potential populations in the analysis area.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. This alternative would have an intermediate level of effect on snags; however, the impact is still considered minor given the expected magnitude of change (see snag and downed wood section). Therefore, there would be no adverse effect on potential roosting habitat or potential populations.

## Neo-tropical Migratory Birds

The Partners in Flight Bird Conservation Plan is used to address the requirements contained in Executive Order (EO) 13186 (January 10, 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*. Under Section 3(E) (6), through the National Environmental Policy Act, the Executive Order requires that agencies evaluate the effects of proposed actions on migratory birds, especially species of concern. The Umatilla National Forest occurs in the Northern Rocky Mountain Landbird Conservation Planning Region, which includes the Blue Mountains sub-region and the Blue Mountains sub-province. Conservation planning for the Blue Mountains, Ochoco Mountains, and Wallowa Mountains sub-provinces is addressed in the *Conservation Strategy for Landbirds* in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000), hereafter referred to in this section as "the Strategy".

The Strategy discusses the migratory and landbird species of concern for the Northern Rocky Mountain Region and the Blue Mountain sub province. "Focal" species were selected and used to represent species of concern and priority habitats identified in the Strategy. Table W-7 identifies priority habitat, habitat features, and focal species identified in the Strategy (Altman 2000).

Table W-7. Priority Habitat Features and Associated Landbird Species for Conservation in the Northern Rocky Mountain Landbird Conservation Region of Oregon and Washington (Altman 2000)

| Habitat Type | Habitat Feature/Conservation Focus | Focal Species |
|---|---|---|
| Dry Forest | Large patches of old forest with large trees and snags | White-headed woodpecker |
| | Old forest with interspersion of grassy openings and dense thickets | Flammulated owl |
| | Open understory with regenerating pines | Chipping sparrow |
| | Patches of burned old forest | Lewis' woodpecker |
| Mesic Mixed Conifer | Large snags | Vaux's swift |
| | Overstory canopy closure | Townsend's warbler |
| | Structurally diverse; multi-layered | Varied thrush |
| | Dense shrub layer in forest openings or understory | MacGillivray's warbler |
| | Edges and openings created by wildfire | Olive-sided flycatcher |
| Riparian Shrub | Willow/alder shrub patches | Willow flycatcher |
| Steppe Shrublands | Steppe shrublands | Vesper sparrow |
| Aspen | Aspen stands | Red-naped sapsucker |

Habitat types and features will be used to evaluate the effects of the proposed activities on migratory landbird species. Those habitat types within the Sunflower Bacon analysis area include Dry Forest, Mesic Mixed Conifer, Riparian Shrub, Steppe-Shrublands, and Aspen. The remaining habitat types (Alpine, Subalpine, Riparian Woodland, and Montane Meadow) would not be affected because those habitat types do not occur in the analysis area. No further analysis of the environmental effects will occur for these habitat types.

## Dry Forest Habitat

### *Current Condition*

Declines of dry forest are among the most widespread and strongest declines among source habitats for terrestrial vertebrates in the Interior Columbia Basin (Wisdom et al. 2000). Within the Blue Mountains and Northern Glaciated Mountains ERUs of the Interior Columbia Basin Assessment, old forest, single-story ponderosa pine habitat has declined by 96 and 99%, respectively (Wisdom et al. 2000). The result of degradation of dry forest due to fire suppression and extensive timber harvest has been the change of large areas of late-seral ponderosa pine forest to mid-seral stands of Douglas-fir and grand fir. Because of the loss of ponderosa pine forest, habitat restoration is the primary strategy for conservation of landbirds associated with this habitat type. Dry forest-associated land birds have suffered the greatest population declines and range retractions of any landbirds in the Northern Rocky Mountain Landbird Conservation Planning Region. In addition to the overall loss of this forest type, two features, snags and old-forest conditions, have been diminished appreciably and resulted in declines of bird species highly associated with these conditions or features. These species include white-headed woodpecker, flammulated owl, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker.

This habitat type includes coniferous forest composed exclusively of ponderosa pine or dry stands co-dominated by ponderosa pine and Douglas-fir and/or grand fir (Altman 2000). Dry forest habitat occurs throughout the analysis area. Habitat criteria for the dry forest habitat type includes: old forest, single-stratum stands, a mosaic of forest structural stages, openings and burned areas, and 350-acre patches of old forest single stratum connected to other old forest single-stratum stands. The habitat criteria listed here summarizes the biological objectives in Altman (2000) for the focal species representing the dry forest habitat type.

In general, the project area meets the dry forest habitat criteria. Old forest single stratum habitat is currently six percent below the Historical Range of Variability (HRV) in the analysis area. Patch size of old forest single-stratum stands is well below the suggested 350 acres in Altman (2000). Old forest single stratum stands would not be affected by proposed treatment activities; proposed treatments would restore or create old forest single stratum habitat in the mid and long term. Old Forest Multi-Strata (OFMS) stands, which are currently six percent above the HRV, would be treated. Patch size exceeds 350 acres for OFMS stands and is connected to other late old structure stands in the analysis area. Potential habitat for the white-headed woodpecker, flammulated owl, chipping sparrow, and Lewis' woodpecker occurs in scattered locations throughout the analysis area. All four species have been observed on the District. However, the white-headed woodpecker, flammulated owl, and Lewis' woodpecker are seen infrequently. These species have not been documented in the analysis area but could occur, based on the vegetative composition and structure in the project area. The Lewis' woodpecker has been observed just outside the analysis area. The chipping sparrow is observed frequently.

### *Direct and Indirect Effects*

#### Alternative 1

In the short term, there would be no change in the composition or structure of dry forest habitats. In the mid and long term, habitat quality of open and semi-open old forest habitats dominated by ponderosa pine would continue to decline due to continued invasion by shade and fire-intolerant tree species. As a result, potential habitat for the chipping sparrow and the white-headed woodpecker (see Table W-7) would decrease in the future under this alternative. Habitat for the flammulated owl would improve due to dense tree regeneration on dry forest habitats. Given that stand densities and fuel loads would increase in the future, the risk of high severity wildfire would also increase. A fire of this type would cause heavy overstory mortality, altering both the structure and composition of dry forest habitats.

#### Alternative 2

Commercial and non-commercial thinning would affect the composition and structure of dry forest habitats. These activities would move dry forest habitats toward a more sustainable condition characterized by lower canopy densities and stands dominated by fire tolerant tree species. These activities would create diversity across the landscape by opening stands. Thinned stands would provide a mosaic of open areas, shrub patches, large trees, and medium-small trees in the affected area. Patch size is not expected to change in response to thinning activities. Habitat conditions for migratory landbirds in the dry forest type would improve because old forest single stratum, the forest mosaic, openings, and patch size would either be maintained or improved as a result of treatment. Snag density would be minimally affected; therefore, there would be no adverse effects on dry forest associated migratory birds requiring this habitat feature. In the short term, thinning could reduce nesting cover by displacing or crushing low-lying vegetation and structure (downed wood and other debris). In the 1 to 3 years following treatment these habitat features would recover.

Proposed thinning and burning activities would promote the development of larger trees, single-layered canopies, understories dominated by herbaceous vegetation, scattered shrub cover, and pine regeneration on dry forest sites in the mid and long term. Prescribed burning and mechanical fuels treatment and thinning could temporarily displace ground and shrub nesting birds associated with grass and shrub communities beneath a forested overstory, but species would re-occupy the habitat as shrubs and other nesting cover regenerate within 1 to 3 years after treatment. There is a potential that commercial and mechanical non-commercial thinning could result nest loss and mortality of developing young within treatment units. Depending on the timing of burning, some nests would be lost. Re-nesting would be expected in unburned patches and/or other locations outside burn units. Spring underburns would burn in a mosaic pattern across the landscape, generally blackening approximately 70 to 80 percent of the area. Proposed prescribed burning would occur in blocks ranging in size from several hundred acres to over one thousand acres. Partitioning burning into smaller burn blocks would ensure that not all habitat proposed for burning is burned in a single year. Adjacent blocks would also not be burned in the same year, maintaining a portion of dry forest habitat in an undisturbed condition for breeding neotropical birds. Because proposed burning would not have uniform effects across the landscape, would be spread out over several years, and would generally occur prior to the nesting season, there would be no adverse impact on dry forest associated migratory bird populations in the analysis area.

Patches of dense pine and fir regeneration would be retained in non-commercial thinning units, maintaining these habitats for migratory birds requiring these patches (focal species: flammulated owl).

Proposed treatment activities would not increase fragmentation of dry forest habitats. All commercial and non-commercial thinning would leave stands fully stocked and with a more appropriate dry forest composition following treatment. It is not expected that aggressive generalist birds will impact dry forest associated migratory birds due to the fact that fragmentation would not increase, stands would maintain dry forest habitat features following treatment, and large early-seral stage openings preferred by these species will not be created.

#### Alternative 3

The effects of this alternative would be similar to those described under Alternative 2. Harvest and thinning would affect the composition and structure of the affected area. This alternative would thin and burn fewer acres of dry forest habitat than Alternative 2. As such, the expected short term impacts (nest cover loss, displacement of individuals, nest loss) of Alternative 3 on dry forest associated migratory birds would be incrementally less than under Alternative 2. In the long term, fewer acres of suitable dry forest habitat would be present in the analysis area under this alternative than Alternative 2.

#### Alternative 4

The effects of this alternative would be similar to those described under Alternative 2. Harvest and thinning would affect the composition and structure of the affected area. This alternative would thin and burn an intermediate amount of dry forest habitat between Alternative 2 and Alternative 3. As such, the expected short term impacts (nest cover loss, displacement of individuals, nest loss) on dry forest associated migratory birds would be incrementally less than under Alternative 2 and slightly greater than Alternative 3. In the long term, fewer acres of suitable dry forest habitat would be present in the analysis area under this alternative than Alternative 2.

### *Cumulative Effects*

#### Alternative 2

Past activities and events in the watershed that have residual effects on dry forest habitat and associated neotropical migratory birds include timber harvest (25,842 acres), wildfire (280 acres), prescribed fire (8,217 acres) and livestock grazing. Timber harvest has altered the structure and composition of forested stands in the analysis area. Generally, these activities reduced late and old structure habitat, increasing the proportion of stand initiation, stem exclusion, and young forest stands in the analysis area. Harvest likely stimulated growth of understory shrubs and grasses in affected stands, improving habitat for some dry forest associated neotropical migratory birds requiring these habitats. Wildfire and prescribed fire both removed nesting and hiding cover in the short term. In the longer term, these activities and events stimulated the growth of grasses and shrubs in dry forest habitats and reduced the amount of shade and fire-intolerant vegetation in dry forest stands. Historic livestock grazing had negative impacts on shrub and grassland communities, altering the structure and species composition in these habitats. This activity also removed nesting cover and structure. More recent livestock grazing impacts dry forest habitat by decreasing ground cover and suppressing shrub communities. These activities have resulted in the current dry forest habitat condition for migratory birds in the analysis area.

Present and reasonably foreseeable future activities that are affecting shrubs and herbaceous vegetation in dry forest habitat include grazing and wildfire suppression. The potential for livestock to utilize forage and shrubs continues, although to a lesser extent than in the past. Current allotment management plans balance livestock utilization with other wildlife management objectives, resulting in a shared utilization of the forage/shrub resource. Fire suppression has excluded the historical role of fire on the landscape, resulting in an increase in the density of trees and a change in species composition. The risk of high severity wildfire has increased in response to fire suppression. A fire of this type would negatively impact dry forest habitat conditions; periodic low intensity fires aid in maintaining these habitats.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be a short term negative impact on ground cover and understory structure due to machinery use and burning; however, it is not expected that habitat quantity or populations would be adversely affected because harvest activities would generally occur outside the breeding season, and burning would occur in a mosaic pattern on the landscape. Burning would be designed to be low intensity underburns that would blacken approximately 70-80 percent of the burn area. Birds and nests in unburned areas would not be impacted. If nests are lost to burning, it is expected that birds would renest. In the mid and long term, the cumulative impact on dry forest habitat features would be positive; the quality of dry forest habitat would increase in response to treatment.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. Alternative 3 would have the least impact on migratory bird habitat due to the fact that this alternative would treat the fewest acres of all the action alternatives. This alternative would positively impact dry forest habitat attributes in the mid and long term; therefore, there would be no adverse effects on dry forest habitat or populations of neo-tropical migratory birds associated with these habitats. The fewest number of acres of dry forest habitat would be affected under this alternative.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. This alternative would have an intermediate level of impact on dry forest habitat. This alternative would positively impact dry forest habitat attributes in the mid and long term; therefore, there would be no adverse effects on dry forest habitat or populations of neo-tropical migratory birds associated with these habitats.

## Mesic Mixed Conifer Habitat

### *Current Condition*

This habitat type includes areas historically and currently dominated by a mix of overstory tree species including Douglas-dir, grand fir/white fir, and western larch. Mesic (moist) mixed conifer habitats are generally higher in elevation, wetter, on northerly aspects, and in draws where soils are mesic (Altman 2000). These habitats are scattered in the southern and eastern portions of the analysis area. Habitat criteria for the riparian shrub habitat type include: Old forest multi-stratum stands, a mosaic of forest structural stages, high canopy closure (>60%) and dense understory vegetation, a mix of forested stands and shrub/grass dominated openings, and >75 acre patches of Old Forest Multi-stratum stands connected to other Old Forest Multi-stratum patches. The habitat criteria listed here summarize the biological objectives in Altman (2000) for the focal species representing the Mesic Mixed Conifer habitat type. The focal species for this habitat type include the Vaux's swift, Townsend's warbler, varied thrush, MacGillivray's warbler, and olive-sided flycatcher.

Currently, there are approximately 238 acres of Mesic Mixed Conifer habitat in the Sunflower Bacon analysis area. This represents 1% of the analysis area. These acres generally meet the habitat criterion presented in Altman's Strategy (2000). A portion of the existing Mesic Mixed Conifer habitat may occur in areas historically dominated by another forest type (i.e. Dry Upland Forest/ponderosa pine). A portion of the existing moist upland habitat is located within proposed treatment units.

## Direct and Indirect Effects

### Alternative 1

There would be no ground disturbing activities associated with implementation of this alternative. This habitat type would continue along existing successional pathways in the short term. In the mid and long term, the available Mesic Mixed Conifer habitat could experience changes in the quantity and quality of habitat in relation to migratory birds. Stand densities would increase in the mid and long term. These stands would be more susceptible to insect and disease outbreaks due to increased stress and competition for resources. Overstory mortality resulting from insects and disease would increase fuel loads. Through no action, there would be a greater risk of high severity wildfire in Mesic Mixed Conifer stands. A fire of this type would eliminate or greatly reduce the availability of suitable Mesic Mixed Conifer habitat in the analysis area for a number of years. Recovery may take 100 years or longer to provide high quality Mesic Mixed Conifer habitat.

### Alternative 2

Approximately 52 acres of Mesic Mixed Conifer habitat would be affected by the proposed harvest and thinning activities. Within these acres, stand densities would be reduced; however, the largest trees in the harvest units would be retained. Species composition would also change following treatment. Treatment would favor the retention of dry upland tree species such as ponderosa pine and western larch. Grand fir and Douglas-fir would be targeted for removal. The Townsend’s warbler and varied thrush (focal species) depend on dense multi-layered closed canopy forest. Treatment would reduce the availability of suitable habitat for these species in the short and mid term. Snags within Mesic Mixed Conifer stands would be impacted the same as those elsewhere; they would not be targeted for removal, but it is likely that a few would be lost during commercial thinning activities. Any loss of snags would be incidental to green tree harvest. Understory vegetation would be disturbed by harvest and mechanical fuels treatment activities. Although brush may be disturbed during the period when harvest occurs, it would quickly recover in the one to three years following harvest. Decreased canopy closure in treated stands could stimulate understory growth, benefiting bird species dependent on dense brush, such as the MacGillivray’s warbler. Habitat for the olive-sided flycatcher may also improve in response to treatment due to the creation of forested edge habitat.

Prescribed burning would affect potential nesting habitat. Spring burning would reduce nesting cover and structural habitat features (dense brush), and could result in nest loss if it occurs in the late spring when breeding and nesting activities have commenced. Nests on the ground and in low vegetation may be lost. Birds would renest in unburned patches or areas outside of treatment units. Because burning would not have uniform effects across the landscape, and would generally occur prior to the nesting season, burning would not have an adverse impact on migratory bird populations associated with the Mesic Mixed Conifer habitat type.

### Alternative 3

The effects of this alternative would be similar to those described under Alternative 2. Under this alternative, approximately 11 acres of Mesic Mixed Conifer habitat would be treated.

#### Alternative 4

The effects of this alternative would virtually be the same as those under Alternative 3. Approximately 16 acres of Mesic Mixed Conifer habitat would be affected under this alternative.

### Cumulative Effects

#### Alternative 2

Past activities that affected moist upland forest habitats included timber harvest, firewood cutting, and fire suppression. A portion of the timber harvest that has occurred in the analysis area has impacted moist upland forest habitat. Past firewood cutting reduced snag densities adjacent to open roads. Fire suppression has had the most influence on shaping the existing condition of moist upland habitat in the analysis area. Fire suppression has allowed multi-layered stands to increase in density. Snag and downed wood densities have also increased substantially in these stands. Species requiring dense multi-layered stands and high snag and downed wood densities have benefited from this activity.

Ongoing activities that are affecting moist upland habitat include fire suppression and personal use firewood cutting. Fire suppression and firewood cutting are having similar effects as those described in the previous section. Current firewood cutting is only affecting snags less than 24 inches in diameter.

Reasonably foreseeable future activities in the analysis area include fire suppression and firewood cutting. Fire suppression and firewood cutting are having similar effects as those described in the previous sections.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be a negative impact on canopy closure and multi-layered characteristics in mesic mixed conifer habitats in response to treatment. Habitat for the Townsend's warbler and the varied thrush (focal species for the previously mentioned habitat features) would be reduced by the proposed treatments. These habitat features would be affected in both the mid and long term. Individuals requiring these habitat features would shift their use to mesic mixed conifer habitats elsewhere in the analysis area. There would also be a short term negative impact on ground cover and understory brush due to machinery use and burning; however, it is not expected that habitat quantity or populations would be adversely affected, because harvest activities would generally occur outside the breeding season and burning would occur in a mosaic pattern on the landscape. Burning would be designed to be low intensity underburns that would blacken approximately 70-80 percent of the burn area. Birds and nests in unburned areas would not be impacted. If nests are lost to burning, it is expected that birds would renest. In the mid and long term, the cumulative impact on mesic mixed conifer forest habitat features (large snags, dense understory shrubs, and edges and openings) would be neutral or positive; the quality of these habitat features would be maintained or increase in response to treatment. Snag densities would continue to meet Forest Plan standards following treatment.

#### Alternative 3

The effects of this alternative would be similar to those described under Alternative 2. The only difference is the number of acres of moist upland habitat that would be treated. Under this alternative, the fewest acres of moist upland habitat would be treated. Due to the size of the area that would be affected under this alternative, it is unlikely that there would be an adverse impact on the Mesic Mixed Conifer habitat type or those species that are associated with this habitat type.

#### Alternative 4

The cumulative effects of this alternative would be the same as those described under Alternative 3. Only 5 acres of treatment distinguish these alternatives from one another. Due to the size of the area that would be affected under this alternative, it is unlikely that there would be an adverse impact on the Mesic Mixed Conifer habitat type or those species that are associated with this habitat type.

## Riparian Shrub Habitat

### *Current Condition*

This habitat type includes riparian communities dominated by shrubs (willow, alder, etc.) that occur along bodies of water (e.g., streamside, lakeside) or in association with wet meadows and wetlands (Altman 2000). The riparian habitat type generally occurs along creeks and streams in the analysis area and may occur adjacent to or within proposed treatment units. Habitat criteria for the riparian shrub type includes: shrubs occupy greater than 40 percent of the site, shrub cover is interspersed with open (herbaceous) areas, tree cover is less than 30 percent, and patch size is greater than 5 acres in size. The habitat criteria listed here summarizes the biological objectives in Altman (2000) for the focal species representing the riparian shrub habitat type.

In general, the project area meets the riparian shrub habitat criteria mentioned above. Along streams and creeks in the affected area, shrub cover occurs in scattered clumps, occupying less than 50 percent of the area. Shrubs are intermixed with open areas. In many areas, tree cover is greater than 40 percent. Generally, patch size is greater than 2 acres in size. Potential habitat for the willow flycatcher occurs along streams at scattered locations throughout the analysis area. The flycatcher has not been documented in the analysis area, but could occur, based on the existing vegetative composition and structure.

### *Direct and Indirect Effects*

#### Alternative 1

Riparian shrub habitat would not be directly affected by current management direction because habitat criteria would essentially remain unaltered in the project area in the short term. Over time, riparian shrub stands in the project area would continue to grow and develop into a more dense community, eventually occupying a larger area. Herbaceous openings would decrease in size with the encroachment of shrub cover. Tree seedlings and saplings may also encroach into openings and occupy sites along streams. Patch size would increase as shrubs occupy more of the area. Overall, habitat suitability for the willow flycatcher would improve as the riparian shrub community develops. As upland vegetation grows and develops into a dense, multi-layer condition, uplands and riparian shrub communities would become more susceptible to high-intensity wildfires and insect or disease outbreaks. A major disturbance on the landscape would change the composition and structure of riparian communities. Initially, riparian communities would have little vegetative cover, but eventually they would become occupied with shrubs and grasses.

#### Alternative 2

Harvest and thinning would not occur in riparian habitat corridors with the exception of aspen unit 18. Therefore, no direct or indirect effects would occur to migratory birds in riparian shrub habitat from this action.

Prescribed burning adjacent to riparian corridors may indirectly alter riparian shrub habitat within the riparian corridor. Burning (underburning and pile burning) to reduce fuels created from harvest activities and thinning may slop-over into the riparian corridor. Due to the low intensity of proposed underburning and high moisture content of fuels when burning occurs, it is unlikely that riparian shrubs would be consumed. Fine fuels may be consumed in riparian areas. Impacts on potential nesting habitat for neotropical migratory birds would be minimal. If riparian shrub habitat were to burn out of prescription, nests could be lost (spring burning only) and migratory birds could be displaced to adjacent unburned habitat. If this were to occur, ignition would be halted. Overstory tree composition and structure would remain unchanged after landscape underburning and activity fuels treatments.

#### Alternative 3

The direct and indirect effects of this alternative would be the same as those described under Alternative 2. This alternative would have the least acres of landscape burning (8,617 acres); when compared to Alternative 2, there would be less chance of riparian shrub habitat being affected.

#### Alternative 4

The direct and indirect effects of this alternative would be the same as those described under Alternative 2. This alternative would have an intermediate level of landscape burning (9,347 acres).

### *Cumulative Effects*

#### Alternative 2, 3, and 4

Past activities and events in the watershed that have affected riparian shrub habitat include grazing and timber harvest. Past grazing reduced the abundance of riparian shrubs and degraded streamside habitats. Past timber harvest occurred in riparian habitat conservation areas (RHCAs) along streams. Harvest altered overstory condition and disturbed streamside shade.

Present activities that are affecting riparian shrub habitat include grazing and wildfire suppression tactics. The potential for livestock to utilize riparian shrubs for forage continues, although to a lesser extent than in the past. Past livestock grazing was much more intense (longer season of use, higher stocking, etc.) than the existing grazing management system in the analysis area. Current allotment management plans balance livestock utilization with other wildlife management objectives, resulting in a shared utilization of the forage/shrub resource. Fire suppression has excluded the historical role of fire on the landscape, resulting in an increase in the density of trees and a change in species composition. As a result, fire behavior has changed from frequent low-intensity to infrequent high-intensity stand replacing burns. High-intensity fires within riparian corridors are not desirable because of the probable loss of overstory tree cover. However, low-intensity fires would periodically maintain and improve shrub quality and quantity in the analysis area.

Future activities and events in the watershed that could affect riparian shrub habitat include livestock grazing. Livestock grazing would continue as described in the present condition.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be no direct impacts on this habitat type under this alternative. These habitats may be indirectly affected by underburning activities; however, given the season and fuel conditions when burning would occur, it is unlikely that habitat features in this habitat type would be affected. Because there would be no direct impacts on this habitat type and because indirect impacts are unlikely to occur, it is expected that there would be no adverse effect on this habitat type or on those species associated with it through implementation of this project.

## Steppe-Shrubland Habitat

### *Current Condition*

Steppe-shrublands occur in a wide range of habitat types, including grassland, sagebrush, montane meadows, fallow fields, juniper-steppe, dry open woodlands, and openings in forested habitats (Altman 2000). Forested habitats within the analysis area are interspersed with grassland, shrubland, and juniper-woodland habitats. These habitats vary in size from a few acres to several hundred acres. Habitat criteria (objectives) for the steppe-shrubland habitat type include maintaining a mosaic of steppe and shrubland habitats with < 10 percent tree cover. The majority of steppe-shrubland habitats in the analysis area meet these objectives, with exceptions where juniper and other fire intolerant species have encroached into these habitats.

No commercial or non-commercial thinning is proposed in these habitats. Landscape burning would occur within these habitats where they are interspersed with treatment units.

### *Direct and Indirect Effects*

#### Alternative 1

In the short term, steppe-shrubland habitat would be unchanged in the analysis area. In the long term, given current fire suppression continues, encroachment of juniper and other conifer species into steppe-shrubland habitats would continue. Species diversity and distribution would decrease in response to further invasion by these species. As a result, nesting structure and cover would be reduced, potentially affecting those species associated with these habitats.

#### Alternative 2

Commercial, non-commercial, and juniper thinning would have no direct or indirect effects on this habitat type because these proposed treatments would not occur in these areas.

Landscape burning has the potential to affect these habitats where burn blocks include grassland and shrubland habitats outside of treatment units. A total of 10,196 acres would be landscape burned under this alternative. Landscape burning would temporarily remove grasses, forbs, and a portion of the shrub layer in these habitats. Prescribed burning could temporarily displace ground and shrub nesting birds associated with grass and shrub communities, but species would re-occupy the habitat in the years following treatment. A prescribed spring underburn is expected to burn in a mosaic pattern across the landscape, generally blackening approximately 50 percent of the area. Prescribed burning could result in nest loss for ground nesting birds in these habitats. Re-nesting would be expected in unburned patches and/or other locations outside the affected area.

#### Alternative 3

The direct and indirect effects of this alternative would be similar to those described under Alternative 2. This alternative would burn the fewest acres of all three of the action alternatives. Approximately 8,617 acres would be underburned under this alternative, with a small portion of these acres lying within steppe-shrubland habitat outside harvest and thinning units. Because it would burn the fewest acres within the analysis area, it is expected that this alternative would affect the fewest acres of steppe-shrubland habitat when compared to the other action alternatives.

#### Alternative 4

The direct and indirect effects of this alternative would be similar to those described under Alternative 2. This alternative would prescribe burn an intermediate number of acres between Alternatives 2 and 3. Approximately 9,347 acres would be landscape underburned under this alternative, with a small portion of these acres lying within steppe-shrubland habitat.

### *Cumulative Effects*

#### Alternative 2

Past activities and actions that affected steppe-shrubland habitat include wildfire, prescribed burning, fire suppression, and grazing. Past wildfire and prescribed burning suppressed invasion by conifers and maintained the diversity and vigor of grasses and shrubs in these habitats. Fire suppression allowed fire-intolerant tree species, such as juniper, to invade steppe-shrubland habitats, increasing tree cover and reducing ground cover through competition and inhibition. Historic grazing reduced ground cover (increased bare ground), and decreased the species richness in these habitats through overgrazing. More recent grazing has seasonally reduced grass and shrub cover in these habitats, but has not caused further reductions in species diversity. These activities and events have combined to create the existing condition of steppe-shrubland habitat in the analysis area.

Ongoing activities within the analysis area that are affecting this habitat type include fire suppression and grazing. Fire suppression has reshaped the analysis area by allowing invasion of fire-intolerant tree species into historically fire-prone areas, altering the composition and structure of steppe-shrubland habitats. Grazing currently affects this habitat type through removal of a portion of the grass and shrub cover in the area.

Grazing and fire suppression would continue to affect this habitat type in the future. The effects of these activities would be the same as those that are currently occurring.

Based on the cumulative effects of past, present, and future actions in the analysis area, this alternative would not adversely impact steppe-shrubland habitat in the analysis area. Few acres of steppe-shrubland habitat would be affected by the proposed activities. Where these habitats are affected through burning it is not expected that habitat quantity or quality would be adversely affected, because burning would be low in intensity and would occur in a mosaic pattern on the landscape. Burning would be designed to be low intensity underburns that would blacken approximately 50 percent of the burn area.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. It is not expected that habitat quantity or quality would be adversely affected under this alternative. The fewest acres of landscape burning would occur under this alternative.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. It is not expected that habitat quantity or quality would be adversely affected under this alternative.

# Aspen Habitat

## Current Condition

This habitat type includes aspen stands associated with streams, springs, and other wet areas. Aspen stands were once widespread throughout the Blue Mountains; however, a combination of factors including fire suppression, competition with invading shade-tolerant species, overgrazing (livestock and wild ungulates), and drought have contributed to their decline. Remnant aspen stands are present along streams and other wet areas within the Sunflower Bacon analysis area. Aspen stand are present in Units 48 and 18. These stands typically consist of single trees or small groups of decadent trees with little to no regeneration in the understory. Habitat criteria for aspen habitat include: large trees and snags (especially aspen and cottonwood) with adequate representation of younger seral stages, greater than 10% cover of saplings in understory, greater than 1.5 trees and snags per acre that are greater than 39 feet tall and 10 inches in diameter, and canopy cover is 30 to 70 percent.

The aspen stands within the analysis area do not meet these criteria. Stands are decadent, with little to no regeneration in the understory, and large aspen snags are scarce.

## Direct and Indirect Effects

### Alternative 1

Aspen habitat would continue to decline under the current management direction in the analysis area in the short and long term. In the absence of fire, continued invasion of aspen stands by shade tolerant conifers would further reduce the ability of aspen to maintain their current distribution and population within the analysis area. Grazing by livestock and big game would further suppress regeneration of these stands. In the long term, aspen would become mature and overmature and die, creating snag habitat. In the absence of regeneration, aspen would be extirpated from the analysis area in the long term.

### Alternative 2

Two aspen stands are known to occur within proposed treatment units. Commercial thinning of conifers within these stands would have a beneficial effect on aspen. Removal of conifers would reduce competition with remaining aspen clones and reduce shading of these habitats, increasing the vigor of remaining aspen. In the absence of further protective measures (i.e. fencing), these stands would be lost in the long term.

Landscape burning would occur in both of the treatment units known to have remnant aspen stands. Burning would further reduce competition with invading conifers and increase the vigor of aspen, encouraging resprouting (suckering) in the years following burning. Treatment activities would improve habitat quality for aspen-associated migratory birds.

### Alternative 3

The effects of this alternative on aspen habitat would be the same as those described under Alternative 2. Both of the stands containing aspen would be treated in the same manner as Alternative 2.

### Alternative 4

The effects of this alternative on aspen habitat would be the same as those described under Alternative 2. Both of the stands containing aspen would be treated in the same manner as Alternative 2.

### *Cumulative Effects*

#### Alternative 2, 3, and 4

Past activities and events in the watershed that have affected aspen habitat include grazing, fire suppression, and prescribed fire. Grazing by domestic livestock has combined with grazing by wild ungulates to reduce aspen regeneration within the analysis area. Aspen regeneration is limited to those areas that are not accessible to big game and livestock. Fire suppression has allowed the encroachment of fire-intolerant and shade-tolerant tree species into aspen stands, increasing competition and reducing the vigor of aspen stands. Low intensity fires historically maintained aspen stands, stimulating regeneration. Prescribed underburning would likely improve growing conditions for aspen by reducing competition with conifers and stimulating regeneration. These activities and events have combined to create the existing condition of aspen habitat in the analysis area.

Present activities that are affecting aspen habitat in the analysis area include grazing and fire suppression. Both of these activities are limiting regeneration in existing stands and reducing the vigor of aging clones through competition.

Future activities that have the potential to affect aspen habitat include grazing, fire suppression, and fencing of aspen. These activities would have similar effects as those that are presently occurring. Fencing of remnant aspen stands would allow regeneration to occur in these stands before they die out. Fencing would maintain remnant aspen stands, increasing cover of aspen in the analysis area and allowing for snag replacement trees in the future.

Based on the cumulative effects of past, present, and future actions, this project would have a positive impact on aspen habitat in the long term. Proposed treatment (and future fencing) would have a positive effect on aspen habitats by reducing competition with conifers and eliminating ungulate grazing. These activities would contribute to the conservation of this habitat type in the analysis area.

## Late and Old Structure and Old Growth Habitats

## Dedicated Old Growth

### *Current Condition*

Old growth (OG) habitats are distributed across the Forest so that there is one old growth habitat unit for every 12,000 to 13,000 acres of capable habitat. Unit size and distribution are variable and depend on the vegetation type and Forest indicator species (Forest Plan 1990) for which the unit was designated. Old Growth units are identified in the Forest Plan as Management Area C1 (Dedicated Old Growth) and Management Area C2 (Managed Old Growth). Old growth units were initially classified as suitable and/or capable habitat for a selected Forest indicator species. Units are to be maintained as old growth tree habitat for appropriate wildlife species (Forest Plan 1990). Units can occur in smaller (50 acre minimum) blocks no more than ¼ mile apart.

The analysis area does not contain any C2 Managed Old Growth areas. However, there are three C1 Dedicated Old Growth units in the north, central, and southeast portion of the analysis area. They are identified as Dedicated Old Growth units 1792, 1802, and 1811 in the Forest GIS layer that identifies old growth habitat. Table W-8 shows these units, their size, and the old growth dependent MIS designated for each unit.

Table W-8. Dedicated Old Growth habitat within the Sunflower Bacon analysis area

| Stand | Location | Acres | Management Indicator Species |
|---|---|---|---|
| C1 – Dedicated Old Growth | | | |
| 1792 | Headwaters of Little Wall Creek | 188 | Pileated Woodpecker (Capable) |
| 1802 | Middle Little Wall, Rough Canyon, Three Trough Creek | 468 | Pileated Woodpecker (Capable) |
| 1811 | Lower Little Wall Creek | 396 | Pileated Woodpecker (Capable) |
| | Total | 1,052 | |

The northern old growth unit (1792) lies partially within the analysis area; the total size of this old growth unit is 380 acres. That portion of old growth unit 1792 within the analysis area lies along a small tributary in the headwaters of Little Wall Creek. The old growth unit in the center of the analysis area (1802) is composed of five separate units. The unit in the southeast portion of the analysis area (1811) is located along the lower portion of Little Wall Creek. All of these units are classified as "Pileated Woodpecker Capable", indicating that they are not currently suitable habitat for this species, but have the potential to provide these habitats in the future. Other C1 and old growth areas occur several miles to the north, east, and south of the Sunflower Bacon analysis area.

All three of the C1 units in the analysis area are classified as "Pileated Woodpecker Capable." However, these units would not be considered capable pileated woodpecker habitat because the vegetative composition of these units is a dry forest type; pileated woodpecker prefer moist forest types. Two of these old growth units (1802 and 1811) generally lie below 4,000 feet, indicating that they are also not suited for the pine marten or the northern three-toed woodpecker. The third unit (1792) lies just above 4,000 feet in elevation; however, the unit is composed of dry forest habitats that would not be considered suitable habitat for the pine marten or the northern three-toed woodpecker. These units should be re-classified as "Other Inventoried Old Growth" and maintained for other wildlife species (northern goshawk, Cooper's hawk, white-headed woodpecker, etc.) associated with old growth habitat conditions (Forest Plan 1990). In addition, unit 1802 does not meet Forest-wide old growth habitat standards (Forest Plan, 4-56) for pileated woodpecker because the distance between several of the five units that comprise this area is greater than the maximum quarter mile identified in the Forest Plan.

Dedicated Old Growth (Management Area C1) would not be affected by proposed vegetative treatments. All proposed treatment units are completely outside of Dedicated Old Growth habitat. One proposed treatment unit abuts old growth unit 1792. Treatment within this unit would maintain or promote the development of late and old structure habitat in the dry upland potential vegetation group. Because there would be no treatment within Dedicated Old Growth habitat, the current composition, structure, and function of Dedicated Old Growth would be maintained under all of the action alternatives. Therefore, no further analysis of the environmental effects on Dedicated Old Growth habitat will occur in this document.

# Late and Old Structure

## *Current Condition*

The wildlife standards in the Regional Forester's Forest Plan Amendment #2 (1995), requires the evaluation of late and old structural stages relative to the quantity of late and old structural stages within or outside the historical range of variability. For the purpose of this standard, late and old structural stages include stands with an old forest multi-strata or old forest single-stratum structural condition. A number of species present on the Umatilla National Forest require late and old structure habitat. These species include pileated woodpecker, white-headed woodpecker, Lewis' woodpecker, pine marten, northern goshawk, Cooper's hawk, sharp-shinned hawk, flammulated owl, great gray owl, Vaux's swift, Townsend's warbler, Hammond's flycatcher, and others.

Late and old forest structural conditions (old forest multi-strata and old forest single-stratum) occupy about 24 percent the analysis area (excluding private land). Within the HRV analysis area, old forest multi-strata habitat is about six percent above the historical range of variability and old forest single-stratum habitat is six percent below the historical range of variability (Vegetation Report). The Regional Forester's Forest Plan Amendment #2 states that harvest is allowed in late and old structural stages that are above or within HRV in order to maintain or enhance late and old structure habitat within a particular biophysical environment or to move one type of LOS habitat into an LOS stage that is deficit (below HRV). All late and old structure habitats proposed for treatment are in an old forest multi-strata habitat structural condition; this structural stage is currently above HRV within the analysis area. Other late and old structural stands outside of proposed treatment units would be unaffected by the proposed activities.

## *Direct and Indirect Effects*

### Alternative 1

In the short term, late and old structure would continue to occupy 24 percent of the analysis area. However, single-layer old forest would remain below the historical range of variability and multi-layered old forest would remain above the historical range of variability. Indirectly, the amount of late and old structure would change over time. With the existing management direction, including fire suppression, late and old structure stands (multi- and single-stratum) in the project area would continue to grow into a multistory structure. This would increase stand density, making stands increasingly susceptible to insect and disease outbreaks and high-severity wildfires. A major disturbance (wildfire) on the landscape would change the composition and structure to an open shrubland/grassland with little or no tree cover. This would result in fewer late and old structure stands in the project area. In particular, old forest single-stratum would be below the historical range of variability and old forest multi-strata would potentially be within, but no longer above, the historical range of variability.

### Alternative 2

Commercial thinning would occur in late and old structural stages in the analysis area under this alternative. Approximately 854 acres of late and old structure would be commercially thinned, changing the composition and structure on these acres. Species adapted to late and old structure ponderosa pine stands in the dry upland forest potential vegetation group (white-headed woodpecker, flammulated owl, Lewis' woodpecker, etc.) would benefit in the mid and long term through treatment. Thinning would also allow for increased growth rates of residual trees, potentially accelerating the development of late and old structure habitat. Harvest activities would reduce the risk of insect and disease outbreaks and high-severity wildfires in late and old structure habitat.

Approximately 26 acres of moist upland forest habitat in a multi-strata late and old structure condition would be treated under this alternative. These acres would be considered potential habitat for pileated woodpecker, although the entire moist upland forest habitat within the analysis area (238 acres) is not sufficient in size to support a pileated woodpecker territory. The density of treated moist upland habitat would be reduced, and canopy closure would decrease; it is unlikely that pileated woodpecker would use this habitat for nesting post-harvest due to reductions in canopy closure. These treated acres would maintain sufficient canopy closure and dead wood after treatment to provide foraging habitat for the pileated woodpecker.

Non-commercial thinning and juniper reduction would occur in late and old structural stages in the project area. This action would affect late and old structure stands by reducing dense understory regeneration of shade tolerant tree species. The understory composition would change to more fire tolerant tree species, like ponderosa pine and western larch. The overstory would remain unchanged following non-commercial thinning in these stands. The understory would be more open, with patches of regeneration occurring through the stand. Thinning activities would reduce the stands susceptibility to high-intensity wildfires and insect or disease outbreaks.

Activity fuels treatment (burning, mastication, and grapple piling) would occur in treated late and old structure habitat. Burning would reduce fuels created from harvest activities. This action would not change the tree composition or structure in harvest units, because prescribed fire would be low intensity. Landscape burning would occur on a total of 10,196 acres. A portion of these acres would occur within late and old structure habitat. This action would not change overstory tree composition or structure in treatment units. Mechanical fuels treatments would not affect the composition or structure of late and old structure habitat. Fuels treatment activities would reduce the stands susceptibility to high-intensity wildfires and insect and disease outbreaks.

#### Alternative 3

The effects of this alternative on late and old structure habitat would be similar to those described under Alternative 2. Approximately 690 acres of late and old structure habitat would be treated, changing the composition and structure on these acres. This alternative would restore less single-stratum ponderosa pine habitat than Alternative 2. Compared to Alternative 2, this alternative would treat 164 fewer acres of late and old structure habitat. The historical range of variability would change old forest single stratum from 9 percent to 10 percent (5 percent below HRV) under this alternative. Old forest multi-strata would remain 26 percent (6 percent above HRV) in the HRV analysis area under this alternative. Treatment of late and old structure habitat would return these stands to a more appropriate species composition; species associated with late and old structure ponderosa pine stands (white-headed woodpecker, flammulated owl, Lewis' woodpecker, etc.) would benefit from these activities through increased quality and quantity of potential habitat.

Approximately 7 acres of moist upland forest habitat in a multi-strata late and old structure condition would be treated under this alternative. These acres would be considered potential habitat for pileated woodpecker, although the entire moist upland habitat within the analysis area is not sufficient in size to support a pileated woodpecker territory. The density of treated moist upland habitat would be reduced, and canopy closure would decrease; it is unlikely that pileated woodpecker would use this habitat for nesting post-harvest due to reductions in canopy closure. These treated acres would maintain sufficient canopy closure and dead wood after treatment to provide foraging habitat for this species.

Activity fuels treatment and landscape burning would have similar effects on late and old structure habitat as those described under Alternative 2. Compared to Alternative 2, this alternative would burn 1,579 fewer acres and treat 852 fewer acres of activity fuels.

Non-commercial thinning would have the same effects as were described under Alternative 2. Non-commercial thinning would not affect overstory structure or composition in late and old structure habitat.

#### Alternative 4

The effects of this alternative on late and old structure habitat would be similar to those described under Alternatives 2 and 3. Alternative 4 would have an intermediate effect on late and old structure habitat. Approximately 790 acres of late and old structure habitat would be treated, changing the composition and structure on these acres. When compared to Alternative 2, this alternative would treat 64 fewer acres of late and old structure habitat. The historical range of variability would change the old forest multi-strata from 26 percent to 25 percent (5 percent above HRV) and old forest single stratum from 9 percent to 10 percent (5 percent below HRV) in the analysis area (see Vegetation Report). A portion of the late and old structure habitat that would be treated under this alternative would have a variable density thin prescription. This prescription would increase within-stand diversity by creating a mosaic of open and dense patches of timber, similar to what historically occurred in the area under the natural fire regime. Treatment of late and old structure habitat would return these stands to a more appropriate species composition; species associated with late and old structure ponderosa pine stands (white-headed woodpecker, flammulated owl, Lewis' woodpecker, etc.) would benefit from these activities through increased quality and quantity of potential habitat in the analysis area.

Approximately 12 acres of moist upland forest habitat in a multi-strata late and old structure condition would be treated under this alternative. It is unlikely that pileated woodpecker would use this habitat for nesting post-harvest due to reductions in canopy closure. These treated acres would maintain sufficient canopy closure and dead wood after treatment to provide foraging habitat for this species.

Activity fuels treatment and landscape burning would have similar effects on late and old structure habitat as those described under Alternatives 2 and 3. Non-commercial thinning would have the same effects as were described under Alternative 2.

### *Cumulative Effects*

#### Alternative 2

Past activities and events in the Sunflower Bacon analysis area that affected late and old structure stands include harvest (25,842 acres), wildfire (280 acres), private-land harvesting (approximately 1,000 acres), and fire suppression. A variety of cutting methods were used to harvest timber, including overstory removal, selective cutting, shelterwood cutting, and commercial thinning. Past harvest (Forest Service and private land) has directly affected late and old structure habitat in the watershed by altering the structure and composition of stands, removing trees greater than 21 inches diameter breast height, and fragmentation of habitats. Wildfire has also resulted in the loss of large trees within the analysis area, although at a fraction of the loss attributed to timber harvest activities. Fire suppression has promoted the development of dense multi-strata late and old structure habitat by allowing the encroachment of fire-intolerant tree species that would have otherwise been killed by periodic fire. Fire suppression has contributed to the existing structural composition and HRV in the analysis area. These activities and events have contributed to the existing condition of late and old structure habitat in the allotment.

Present activities that would have a cumulative effect on late and old structure habitat include wildfire suppression and firewood cutting.  Firewood cutting removes snags (less than 24 inches) adjacent to open roads, reducing hazards adjacent to open forest roads and providing a service to the public. Decades of fire suppression have reshaped the landscape through fire exclusion.  Historically, fire played a role in thinning the forest and maintaining a higher proportion of fire resistant species like ponderosa pine and western larch.  Fire exclusion has allowed an increase in stand densities and altered species composition, allowing a higher proportion of Douglas and grand fir to invade dry upland forest habitats.  As a result, fire behavior has changed from frequent low-severity fires to infrequent high-severity stand replacing burns.  Few late and old structure stands have burned in more recent times, but all old forest multi-strata stands in the watershed are highly susceptible to stand replacement fires.

Continued wildfire suppression in the future would increase stand densities in a similar fashion as was described for past fire suppression.  Over the long term, continued fire suppression would increase the chance of a high severity wildfire in the analysis area.

Based on the cumulative effects of past, present, and future actions in the analysis area, late and old structure habitat will continue to meet Forest Plan standards, as amended, following treatment.  All treatment within LOS would occur in structural stages and potential vegetation groups that are within or above the Historic Range of Variability (see Vegetation section).  Late and old structure habitat attributes would be maintained and enhanced by treatment activities.  Treated LOS stands would be moved toward a more sustainable, single-stratum condition more characteristic of historic conditions in the analysis area.  Species associated with these habitats (white-headed woodpecker, flammulated owl, etc.) would benefit; habitat quantity and quality for those species requiring multi-strata late and old structure habitat would be reduced.  Under this alternative, there would be no reduction in late and old structure habitat following treatment; the proposed activities are consistent with the Forest Plan and the Eastside Screens.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. Treated LOS stands would be moved toward a more sustainable, single-stratum condition more characteristic of historic conditions in the analysis area.  The fewest acres of LOS would be treated under this alternative.  Species associated with these habitats (white-headed woodpecker, flammulated owl, etc.) would benefit; habitat quantity and quality for those species requiring multi-strata late and old structure habitat would be reduced.  Under this alternative, there would be no reduction in late and old structure habitat following treatment; the proposed activities are consistent with the Forest Plan and the Eastside Screens.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. Treated LOS stands would be moved toward a more sustainable, single-stratum condition more characteristic of historic conditions in the analysis area.  The fewest acres of LOS would be treated under this alternative.  Species associated with these habitats (white-headed woodpecker, flammulated owl, etc.) would benefit; habitat quantity and quality for those species requiring multi-strata late and old structure habitat would be reduced.  Under this alternative, there would be no reduction in late and old structure habitat following treatment; the proposed activities are consistent with the Forest Plan and the Eastside Screens.

# Connectivity

## Current Condition

Wildlife standards in the Regional Forester's Forest Plan Amendment #2 (1995) require late and old structural stands and designated old growth areas to be connected to each other across the landscape. For this standard, connective habitat does not necessarily need to meet the same description of suitable habitat, but provide "free movement" between late and old structural stands and old growth areas, for various wildlife species associated with the late and old structural condition.

For the majority of the watershed, late and old structural stands and old growth areas are connected to each other with medium (9 to 14.9 inches diameter breast height) to large trees (greater than 14.9 inches diameter breast height), stands with variable widths greater than 400 feet, and attached with 2 or more different connections. Connectivity habitat was identified using the Forest GIS database. Connectivity habitat was identified based on stand data (structure, canopy closure, cover type, etc.) in the existing vegetation database. Portions of the analysis area have naturally low potential to provide connectivity habitat due to the grass-tree mosaic nature of the area (timbered stringers and draws bordered by open grassland and shrubland). In several instances, stands with a stand initiation structure were used to provide connection to late and old structure habitat due to low natural connectivity.

## Direct and Indirect Effects

### Alternative 1

In the short term, late and old structure stands and old growth stands would remain connected across the landscape and within the project area with medium to large trees, corridor widths greater than 400 feet, and by two or more corridors. Indirectly, current connectivity to late and old structure stands in the project area would change over time. With the existing management direction including fire suppression, stands in the project area would continue to grow into dense multi-layered stands. This condition would increase the susceptibility to wildfire and insect and disease outbreaks. A major disturbance on the landscape would change the composition and structure to an open shrubland/grassland with little or no tree cover. As a result, late and old structure and old growth stands would be disconnected from other late and old structure stands in the analysis area and/or watershed. This would limit "free movement" between late and old structure and old growth stands within and outside the analysis area for wildlife species associated with these habitats.

### Alternative 2

Harvest activities would essentially change the density of live trees in treated stands. As a result, the composition and structure of treated stands would change. Multi-layered stands would be thinned, removing a portion of the smaller trees in the stand. These stands would move toward a single-layer condition more characteristic of the dry upland forest potential vegetation group. Stand composition would shift from a Douglas-fir/mixed conifer dominated type to a more historical vegetation composition, with ponderosa pine dominating these stands. The largest trees within treated stands would be retained.

Non-commercial thinning would have no impact on the quality of connectivity habitat. Non-commercial thinning treatments would not impact overstory composition; therefore, canopy closure would not be reduced in response to treatment. A portion of the understory cover-providing vegetation would be maintained in non-commercially thinned units. Proposed commercial thinning within connectivity habitat would maintain or encourage the development of late and old structure habitat in dry upland forest habitat. This action would reduce stand densities to levels more characteristic of dry forest stands. The overstory composition would change to more fire tolerant tree species (ponderosa pine with Douglas-fir subdominant). Canopy closure would be reduced through the removal of a portion of the understory canopy and smaller overstory trees. Following treatment, all late and old structure and old growth stands would meet the standards in the “Eastside Screens” for connectivity habitat; at least two connections that exceed the upper 1/3 canopy closure for that particular potential vegetation group would be maintained between these stands. Corridors would be at least 400 feet wide and have medium and large trees.

Activity fuels would be treated within harvest units. Burning, mechanical treatment, or a combination of the two would be used to reduce fuel loads in late and old structure habitat following harvest. Landscape underburning would also occur throughout much of the area, including connectivity habitat. Burning (activity fuels or underburning) would not change overstory composition or structure in connectivity habitat or in late and old structure habitat, maintaining canopy closure. Burning and mechanical fuels treatment would affect understory vegetation and structure within connectivity stands in the short term. Understory vegetation would recover from disturbance in the 1 to 3 years following treatment. It is expected that the impact of these activities would be minor, and that the quality of the affected connective habitat would not be reduced beyond the short term.

#### Alternative 3

The environmental effects of this alternative would be similar to those described under Alternative 2. This alternative would treat the fewest number of acres of all three action alternatives. Treatment within connectivity corridors would maintain or encourage the development of late and old structure habitat in dry upland forest habitat. Canopy closure would be reduced through the removal of a portion of the understory canopy and smaller overstory trees. Following treatment, all late and old structure and old growth stands would meet the standards in the “Eastside Screens” for connectivity habitat; at least two connections that exceed the upper 1/3 canopy closure for that particular potential vegetation group would be maintained between these stands. Corridors would be at least 400 feet wide and have medium and large trees.

Burning and mechanical fuels treatment under this alternative would have the same effects as those described in Alternative 2. This alternative would underburn the fewest acres when compared to the other action alternatives.

#### Alternative 4

The environmental effects of this alternative would be similar to those described under Alternative 2 and 3. Commercial harvest within connectivity corridors would maintain or encourage the development of late and old structure habitat in dry upland forest within the analysis area. Canopy closure would be reduced through the removal of a portion of the understory canopy and smaller overstory trees. Following treatment, all late and old structure and old growth stands would meet the standards in the “Eastside Screens” for connectivity habitat; at least two connections that exceed the upper 1/3 canopy closure for that particular potential vegetation group would be maintained between these stands. Corridors would be at least 400 feet wide and have medium and large trees.

Burning under this alternative would have the same effects as those described in Alternative 2. Burning (activity fuels or landscape underburning) and mechanical treatment would not change overstory composition or structure in connectivity habitat.

## Cumulative Effects

### Alternative 2

Past activities and events in the Sunflower Bacon analysis area that would cumulatively affect late and old structure stands include harvest (25,842 acres), private-land harvesting (approximately 1,000 acres), and fire suppression. Past harvest activities (Forest Service and private) throughout the area have directly affected the structure and composition of late and old structure and connectivity habitat in the analysis area through the removal of trees greater than 12 inches diameter breast height. Fire suppression has promoted the development of dense multi-strata habitats that provide connectivity habitat within the analysis area. These past activities and events have resulted in the existing condition of connectivity habitat in the analysis area.

Present activities that could affect connectivity habitat include wildfire suppression. Fire exclusion has allowed an increase in the density of trees and a change in species composition, changing the value of connective corridors to wildlife species. Generally, an increase in stand density and deadwood habitat would enhance connectivity habitat by increasing understory screening cover and nesting, foraging, and denning habitat for late and old structure associated species. Increased stand densities also increase the risk of high severity wildfire in the analysis area. Few connectivity stands have burned in more recent times, but all multi-layered stands in the watershed are susceptible to stand replacement fires.

There are no other reasonably foreseeable future activities in the analysis area with a potential to affect connectivity habitat.

Based on the cumulative effects of past, present, and future actions in the analysis area, the proposed treatment within connectivity habitat under this alternative is consistent with the amended Forest Plan. Connectivity habitat treated under this alternative would continue to allow for the free movement of late and old structure associated wildlife. Because the proposed activities would not reduce connectivity within the analysis area, there would be no adverse effects on these habitats or those species that use these corridors to pass between late and old structure habitat and designated old growth stands.

### Alternative 3

The cumulative effects of this alternative would be similar to those described under Alternative 2. Although connectivity habitat would be treated, all LOS stands and designated old growth would continue to meet the amended Forest Plan standards for connectivity under this alternative. There would be no adverse effect on connectivity habitat or those species that use these habitats to pass between late and old structure and old growth habitats under this alternative.

### Alternative 4

The cumulative effects of this alternative would be similar to those described under Alternative 2. Although connectivity habitat would be treated, all LOS stands and designated old growth would continue to meet the amended Forest Plan standards for connectivity under this alternative. There would be no adverse effect on connectivity habitat or those species that use these habitats to pass between late and old structure and old growth habitats under this alternative.

## Dead Wood Habitat

The Umatilla Forest Plan (1990) established standards and guidelines for dead standing and downed wood for various levels of biological potential in each management area. The plan was amended in 1995 by the Regional Forester's Forest Plan Amendment #2, also known as the "Eastside Screens." Based on amended direction, new snag requirements and replacement trees objectives were developed for the five vegetative working groups on the Forest and documented in the memo, "*Interim Snag Guidance for Salvage Operations*" (Umatilla National Forest 1993). Two of the working groups in this document are applicable to the Sunflower Bacon analysis area: ponderosa pine and south association. The majority of the analysis area (68%) is made up of the dry upland forest potential vegetation group (PVG). The ponderosa pine and south association working groups would be included in the dry upland forest potential vegetation group. Approximately 1% of the analysis area occurs in moist upland forest potential vegetation group. The south association is also represented in the moist upland forest potential vegetation group.

For coarse scale analysis or when fine scale data is not available, data from Current Vegetation Survey (CVS) plots is used for analyzing effects on snags and downed wood. CVS data will be used in this analysis to estimate snag densities at the watershed scale to compare with DecAID snag densities. In addition, downed wood evaluations use CVS data to compare Forest Plan standards for downed wood at the watershed scale.

CVS plot/point data was initially collected from 1993 to 1995 and re-measured on selected plots in 1997 and 1999 on the Umatilla National Forest. The Tussock moth outbreak occurred on the Heppner Ranger District in 2000-2001, after the 1999 re-measurement of CVS plots in the Wall Creek watershed. Snag and downed wood estimates might be slightly higher than the current CVS inventory estimate for snags and downed wood as a result of the Tussock moth outbreak, but not significantly higher than the current estimates used in this analysis.

CVS estimates used in this analysis are not statistically valid at the project scale or for a specific site within the watershed. Snags and downed wood tend to occur on the landscape as singles, groups, clumps, patches, or piles resulting from "natural" tree mortality and disturbances, such as fires, insect and disease, ice storms, and drought. These random events result in an uneven distribution of snag and downed wood across the landscape. Therefore, density estimates averaged from CVS inventories for each potential vegetation group are appropriate for analysis at the watershed scale and provide a statistically valid estimate for the watershed.

More recently, the Decayed Wood Advisor (DecAID) by Mellen et al. (2003) has become available. This information source provides guidance to land managers evaluating effects of forest conditions and existing or proposed management activities on organisms that use snags, downed wood, and other wood decay elements. DecAID is a statistical summary of empirical data from published research on wildlife and deadwood. Data provided in DecAID allows the user to relate the abundance of deadwood habitat for both snags and logs to the frequency of occurrence of selected wildlife species that require dead wood habitat for some part of their life cycle. This data is displayed at 30 percent, 50 percent, and 80 percent "tolerance levels." Tolerance levels are not indicators of population viability or potential populations. Tolerance levels are estimates of all individuals in the population that value a particular parameter (e.g., snag density, snag diameter, downed wood density, etc. (Mellen et al. 2003)). Tolerance levels are equivalent to the potential (percent) for individuals to occur in an area having certain deadwood (snag, etc.) characteristics (density, size, etc.). Essentially, the lower the tolerance level, the fewer individuals will likely use the area (landscape, watershed, etc.). DecAID evaluations are best performed at the watershed or larger scale. In this analysis, DecAID will be used to analyze the effects of each alternative on snag densities in the snag analysis area (Wall Creek watershed).

## Dead Standing Trees (Snags), includes effects for primary cavity excavators – MIS and pileated woodpecker – MIS

### *Current Condition*

The snag analysis area for this project is approximately 69,192 acres in size. All of the Dry Upland and Moist Upland Forest within the Wall Creek watershed is included in the snag analysis area. Snags occur as scattered singles, clumps, and/or patches resulting in variable densities across the landscape.

Based on CVS data in the snag analysis area (Wall Creek watershed), snag densities exceed Forest Plan standards in all diameter classes for the dry upland forest potential vegetation group (Table W-9). Snag densities in moist upland forest habitat also exceed Forest Plan standards (Table W-9). This data indicates that adequate habitat is present for primary cavity excavating bird species in the analysis area.

Table W-9. Forest Plan Standards for Snag Density and Existing Conditions in the Wall Creek Watershed.

| Umatilla Forest Plan Standards | | | Wall Creek Watershed | | |
|---|---|---|---|---|---|
| Working Group | Diameter Class Groups (Inches DBH) | Snag Density (#/acre) | Potential Vegetation Group | Diameter Class Groups (Inches DBH) | Snag Density (#/acre) |
| Ponderosa Pine/South Association | ≥ 10 | 2.25 | Dry Upland Forest | ≥ 10 | 6.84 |
| | ≥ 12 | 1.50 | | ≥ 12 | 3.18 |
| | ≥ 20 | 0.14 | | ≥ 20 | 1.62 |
| South Association | >10 | 2.25 | Moist Upland Forest | >10 | 64.72 |
| | >12 | 1.50 | | >12 | 20.16 |
| | >20 | 0.14 | | >20 | 10.15 |

For the DecAID evaluation, relative to Wall Creek watershed, the ponderosa pine/Douglas-fir forest wildlife habitat type (Mellen et al. 2005) is the dominant forest type in the project area and watershed. The small/medium structural condition class (Mellen et al. 2005) was selected for the DecAID analysis because it represents the structural stages that would be affected by the proposed action and because there is no difference in the cumulative species curves for snag density between the structural stages provided by DecAID. The pileated woodpecker and the white-headed woodpecker are the only two species identified on the cumulative species curve for snag density in the ponderosa pine/Douglas-fir habitat type. The white-headed woodpecker will be used for the comparison because it is a better representative of the dry forest type than the pileated woodpecker.

Table W-10. DecAID Tolerance Levels for the White-headed Woodpecker in the Ponderosa Pine/Douglas-fir Forest[1]

| Diameter Group (Inches DBH) | Snag Density (#/acre) | | | |
|---|---|---|---|---|
| | DecAID Tolerance Levels | | | CVS Data, Wall Creek |
| | 30% | 50% | 80% | |
| ≥ 10 | 0.3 | 1.7 | 3.7 | 6.8 |
| ≥ 20 | 0.5 | 1.8 | 3.8 | 1.6 |

[1] For the small/medium trees structural condition class and snag density data from current vegetation survey inventories in the Wall Creek watershed

Snag densities were derived from current vegetation survey data for the dry upland forest potential vegetation group and compared to the white-headed woodpecker cumulative species curves for snag density in DecAID for the Wall Creek watershed. Estimates for snag densities exceed the 80 percent tolerance level for the white-headed woodpecker in the ≥10-inch (9.85 inch) diameter group, when compared with the snag density cumulative species curves in DecAID. For the ≥20-inch (19.7 inch) diameter group, snag density in the watershed occur between the 30 percent and 50 percent tolerance levels for the white-headed woodpecker (Table W-10).

The moist upland forest potential vegetation group is limited within the analysis area. Approximately 238 acres of moist upland forest habitats are present in the Sunflower Bacon analysis area. For the DecAID evaluation, relative to Wall Creek watershed, the Eastside Mixed Conifer habitat type (Mellen et al. 2005) was selected because it most accurately represents the moist upland forest potential vegetation group. The small/medium structural condition class (Mellen et al. 2005) was selected because for the DecAID analysis because it represents the variety of structural stages affected in the proposed action. In addition, there is no difference in the cumulative species curves for snag density between the three structural stages. The pileated woodpecker cumulative species curve for snag density was selected for the analysis in these habitats because it is associated with moist mixed conifer habitats.

Table W-11. DecAID Tolerance Levels for the Pileated Woodpecker in the Eastside Mixed Conifer Forest[1]

| Diameter Group (Inches DBH) | Snag Density (#/acre) | | | |
|---|---|---|---|---|
| | DecAID Tolerance Levels | | | CVS Data, Wall Creek |
| | 30% | 50% | 80% | |
| ≥ 10 | - | 30.4 | - | 64.7 |
| ≥ 20 | - | 7.32 | - | 10.2 |

[1] For the small/medium trees structural condition class and snag density data from current vegetation survey inventories in the Wall Creek watershed

Snag densities were derived from current vegetation survey data for the moist upland forest potential vegetation group and compared to the pileated woodpecker cumulative species curves for snag density in DecAID for the Wall Creek watershed. DecAID did not provide estimates for snag densities at either the 30% or 80% tolerance levels. Estimates for snag densities exceeded the 50 percent tolerance level for the pileated woodpecker in the ≥10-inch (9.85 inch) and ≥20-inch (19.7 inch) diameter groups, when compared with the snag density cumulative species curves in DecAID (Table W-11).

## Direct and Indirect Effects

### Alternative 1

In the short term (0 to 3 years), dead standing trees (snags) would continue to occupy the project area at current densities and size classes, maintaining primary cavity excavator habitat. With the existing management direction including fire suppression, snags would eventually fall, changing the density in the project area. At the watershed scale, dead standing trees would continue to occur at current size classes and densities, in the absence of natural disturbance (insect/disease, wildfire, etc.). In the short term, snag densities would continue to exceed the 80 percent tolerance level for the white-headed woodpecker in the greater than 10-inch group and remain between the 30 percent and 50 percent tolerance levels for the greater than 20-inch group. When compared to the pileated woodpecker cumulative species curves in DecAID, snag densities in the analysis area would continue to exceed the 50 percent tolerance level in both the greater than 10-inch group and the greater than 20-inch group.

In the mid and long term, snag densities would likely increase due to insect and disease infestations in dense, overstocked stands. Increased snag densities and fuel loads increase the risk of high severity wildfire in the analysis area. A high severity wildfire would cause high overstory mortality, and consume a portion of existing snags. A high severity wildfire would create many more snags than it would consume. High severity wildfire would create high snag density patches of habitat valuable to a number of primary cavity excavator species (black-backed woodpecker, Lewis' woodpecker, etc.). Over time, snags would fall, reducing snag densities. Eventually, a high severity fire area would be deficient in snags. It would take upwards of 80 to 100 years to produce trees large enough to produce snags that would be used by primary cavity excavator species.

### Alternative 2

Proposed harvest activities (salvage and commercial thinning) would directly and indirectly affect dead standing trees in the project area. A high proportion of the trees that would be harvested in the project area are live green trees. A total of 2,456 acres would be commercially thinned under this alternative. It is expected that some snags would be felled within commercial thinning units to meet OSHA operational requirements (provide for safety). In addition, harvest operations (skidding, skid trails, landings, etc.) have the potential to impact snag densities. Any removal or felling of snags within commercial thinning units would be incidental to green-tree harvest and thinning activities. Potential primary cavity excavator roosting and nesting habitat would be lost to provide for safety within treatment units and along roads used for haul. Snags would not be targeted for removal in treatment units. Snag densities within the analysis area would meet Forest Plan standards following treatment. Larger snags would be retained where they are available.

Approximately 40 acres within Units 56 and 57 (southern portion of the analysis area) would be salvage harvested. The portions of these units that would be salvaged were impacted by the 2000-2001 tussock moth outbreak on the Heppner Ranger District. A high proportion of the trees being harvested in these portions of units 56 and 57 (40 acres) would be dead. Harvest of snags from the tussock moth mortality would reduce a high density pulse of snags in the analysis area. Potential habitat for primary cavity excavators relying on or taking advantage of these high density pulses of snags (black-backed woodpecker, Lewis' woodpecker, etc.) may be reduced.

Given the logging systems proposed for treatment units, the topography of the area, and experience during past harvest operations; the expected loss of snags is very small. In order to produce post harvest snag densities at the watershed scale for comparison to snag densities in DecAID, it will be assumed that 20% of the existing snags will be felled in commercial thinning units. A 20% loss of snags in treatment units would be considered very high based on experience during past harvest operations. Use of values less than this (e.g. 10% of existing snags felled) fails to provide post-harvest snag densities at the watershed scale that differ from the existing condition or between action alternatives. The following tables (Table W-12 and Table W-13) compare existing snag densities at the watershed scale to post harvest estimates of snag density (based on the assumption that 20% of existing snags would be felled in commercial thinning units).

At the watershed scale, the proposed action would not reduce snag densities in the ≥20-inch group (Table W-12) in dry upland forest habitat when compared to the current condition (Table W-10). In the ≥10-inch group, snag density at the watershed scale would be reduced from 6.8 to 6.7 snags per acre in the dry upland forest potential vegetation group.

Table W-12. Alternative 2 Snag Densities for Pre-harvest and Post-harvest Treatment in Dry Upland Forest in the Sunflower Bacon Analysis Area (Wall Creek Watershed).

| Evaluation Areas | | Unit | Diameter Group | |
|---|---|---|---|---|
| | | | ≥ 10” dbh | ≥ 20” dbh |
| Analysis Area | Watershed | Acres | 62,805 | 62,805 |
| | Affected Area | | 2,430 | 2,430 |
| Pre-Harvest | Snag Density | Snags/Acre | 6.8 | 1.6 |
| | Watershed | Total Snags | 427,074 | 100,488 |
| | Affected Area | | 16,524 | 3,888 |
| Post-Harvest | Affected Area | Total Snags | 13,162 | 3,159 |
| | Watershed | | 423,712 | 99,759 |
| | Difference from Pre-Harvest | | 3,362 | 729 |
| | Snag Density (Watershed) | Snags/Acre | 6.7 | 1.6 |

When compared to white-headed woodpecker cumulative species curves in DecAID, for the previously mentioned habitat type and structural condition, densities would continue to exceed the 80 percent tolerance level for the white-headed woodpecker in the 10-inch group and the 30% tolerance level for the 20-inch group.

At the watershed scale, effects from the proposed action would reduce the snag density for the ≥10-inch group by 0.1 snags per acre (Table W-13) in moist upland forest habitat when compared to the current condition (Table W-11). This is less than a 1 percent reduction for snags greater than 10 inches dbh. In the greater than or equal to 20-inch group, snag densities in moist upland habitat would not change under this Alternative (Table W-13).

Table W-13. Alternative 2 Snag Densities for Pre-harvest and Post-harvest Treatment in Moist Upland Forest in the Sunflower Bacon Analysis Area (Wall Creek Watershed).

| Evaluation Areas | | Unit | Diameter Group | |
|---|---|---|---|---|
| | | | ≥ 10” dbh | ≥ 20” dbh |
| Analysis Area | Watershed | Acres | 6,387 | 6,387 |
| | Affected Area | | 26 | 26 |
| Pre-Harvest | Snag Density | Snags/Acre | 64.7 | 10.2 |
| | Watershed | Total Snags | 413,239 | 65,147 |
| | Affected Area | | 1,682 | 265 |
| Post-Harvest | Affected Area | Total Snags | 1,347 | 213 |
| | Watershed | | 412,904 | 65,095 |
| | Difference from Pre-Harvest | | 335 | 52 |
| | Snag Density | Snags/Acre | 64.6 | 10.2 |

Forest Plan standards for standing dead trees would be maintained in the watershed and analysis area after treatment. In the salvage portion of the analysis area, at least 4 snags per acre (2 snags ≥10 inches dbh and 2 snags ≥20 inches dbh, where available) would be retained. Ponderosa pine and Douglas-fir would be the preferred snag for retention in salvage units.

Temporary roads used for harvest operations would also directly and/or indirectly affect dead standing trees in the project area. Four miles of temporary roads would be constructed under this alternative. Dead standing trees along and adjacent to temporary roads would be felled to provide for safety.

Burning of activity fuels within harvest units is not expected to directly affect the density of snags retained after harvest. Burning of slash and piles (mechanically treated prior to burning) in units would reduce fuels created by harvest and thinning, and reduce understory vegetation. Piles would not be placed next to snags identified for retention. The potential loss of dead standing trees from underburns is expected to be minimal. Landscape burning (including activity fuels burning) would occur on 10,196 acres in the analysis area. This type of underburn would burn at a low intensity within the analysis area. Snag densities in underburned stands are expected to remain above Forest Plan standards after treatment.

Non-commercial thinning and juniper reduction within harvest units would not directly or indirectly affect dead standing trees in thinning units. Dead standing trees would not be cut down during non-commercial thinning activities; only small diameter green trees would be thinned or removed.

#### Alternative 3

The environmental effects of this alternative are similar to those described under Alternative 2. A total of 1,604 acres would be commercially thinned under this alternative. Some snags would be felled within commercial thinning units to meet OSHA operational requirements (provide for safety); otherwise, snags would be retained in all commercial harvest units. Under Alternative 3, Units 56 and 57 would be treated in the same manner as was described for Alternative 2. Approximately 40 acres would be salvage harvested under this alternative. As was the case under Alternative 2, potential habitat for species requiring high density pulses of snags resulting from disturbance events (fire, insects and disease, etc.) may be reduced by salvage harvest activities. Because this alternative would treat the fewest acres of all of the action alternatives, it would have the least impact on potential primary cavity excavator habitat (snags). This effect is expected to be minimal because few snags will be impacted.

The following tables (Table W-14 and Table W-15) compare existing snag densities at the watershed scale to post harvest estimates of snag density. Tables W-13 and W-14 assume that 20% of the existing snags within commercial thinning units would be felled. A 20% loss of snags in treatment units would be considered very high based on experience during past harvest operations. Use of values less than this (e.g. 10% of existing snags felled) fails to provide post-harvest snag densities at the watershed scale that differ from the existing condition or between action alternatives. At the watershed scale, the proposed action would not reduce snag densities in the ≥10-inch group or the ≥20-inch group (Table W-14) in dry upland forest habitat when compared to the current condition (Table W-10).

Table W-14. Alternative 3 Snag Densities for Pre-harvest and Post-harvest Treatment in Dry Upland Forest in the Sunflower Bacon Analysis Area (Wall Creek Watershed).

| Evaluation Areas | | Unit | Diameter Group | |
|---|---|---|---|---|
| | | | ≥ 10” dbh | ≥ 20” dbh |
| Analysis Area | Watershed | Acres | 62,805 | 62,805 |
| | Affected Area | | 1,597 | 1,597 |
| Pre-Harvest | Snag Density | Snags/Acre | 6.8 | 1.6 |
| | Watershed | Total Snags | 427,074 | 100,488 |
| | Affected Area | | 10,860 | 2,555 |
| Post-Harvest | Affected Area | Total Snags | 8.630 | 2,076 |
| | Watershed | | 424,844 | 100,009 |
| | Difference from Pre-Harvest | | 2,230 | 479 |
| | Snag Density | Snags/Acre | 6.8 | 1.6 |

When compared to white-headed woodpecker cumulative species curves in DecAID, for the previously mentioned habitat type and structural condition, densities would continue to exceed the 80 percent tolerance level for the white-headed woodpecker in the 10-inch group and the 30 percent tolerance level in the 20-inch group.

At the watershed scale, the proposed action would not reduce snag densities in either the ≥10-inch group or the ≥20-inch group (Table W-15) in moist upland forest habitat when compared to the current condition (Table W-11).

Table W-15. Alternative 3 Snag Densities for Pre-harvest and Post-harvest Treatment in Moist Upland Forest in the Sunflower Bacon Analysis Area (Wall Creek Watershed).

| Evaluation Areas | | Unit | Diameter Group | |
|---|---|---|---|---|
| | | | ≥ 10" dbh | ≥ 20" dbh |
| Analysis Area | Watershed | Acres | 6,387 | 6,387 |
| | Affected Area | | 7 | 7 |
| Pre-Harvest | Snag Density | Snags/Acre | 64.7 | 10.2 |
| | Watershed | Total Snags | 413,239 | 65,147 |
| | Affected Area | | 453 | 71 |
| Post-Harvest | Affected Area | Total Snags | 363 | 57 |
| | Watershed | | 413,149 | 65,133 |
| | Difference from Pre-Harvest | | 90 | 14 |
| | Snag Density | Snags/Acre | 64.7 | 10.2 |

Forest Plan standards for standing dead trees would be maintained in the watershed and analysis after treatment. In the salvage portion of the analysis area, at least 4 snags per acre (2 snags ≥10 inches dbh and 2 snags ≥20 inches dbh, where available) would be retained.

Dead standing trees along and adjacent to the 2.4 miles of temporary roads could be felled reducing overall snag densities.

Landscape burning within the analysis area (8,617 acres) would have similar effects as those described previously. Snag densities in underburned stands are expected to remain above Forest Plan standards (2.25 snags per acre) after treatment.

Non-commercial thinning and juniper reduction would not affect snag density.

### Alternative 4

The environmental effects of this alternative are similar to those described under Alternatives 2 and 3. A total of 2,057 acres would be commercially thinned under this alternative. Some snags would be felled within commercial thinning units to meet OSHA operational requirements (provide for safety); otherwise, snags would be retained in all commercial harvest units. Under Alternative 4, Units 56 and 57 would be treated in the same manner as was described for Alternative 2. Approximately 40 acres would be salvage harvested under this alternative. As was the case under Alternative 2 and 3, potential habitat for species requiring high density pulses of snags resulting from disturbance events (fire, insects and disease, etc.) may be reduced by salvage harvest activities. This alternative would commercially thin an intermediate number of acres; it is expected that the effect on snags will be slightly greater than Alternative 3 and less than Alternative 2. Because treatment activities would have a minimal impact on snag densities, there would be no adverse impacts on potential primary cavity excavator habitat.

The following tables (Table W-16 and Table W-17) compare existing snag densities at the watershed scale to post harvest estimates of snag density. Tables W-15 and W-16 assume that 20% of the existing snags within commercial thinning units would be felled. A 20% loss of snags in treatment units would be considered very high based on experience during past harvest operations. Use of values less than this (e.g. 10% of existing snags felled) fails to provide post-harvest snag densities at the watershed scale that differ from the existing condition or between action alternatives. At the watershed scale, the proposed action would not reduce snag densities in either the ≥10-inch or ≥20-inch groups (Table W-

16) in dry upland forest habitat when compared to the current condition (Table W-10).

Table W-16. Alternative 4 Snag Densities for Pre-harvest and Post-harvest Treatment in Dry Upland Forest in the Sunflower Bacon Analysis Area (Wall Creek Watershed).

| Evaluation Areas | | Unit | Diameter Group | |
|---|---|---|---|---|
| | | | ≥ 10" dbh | ≥ 20" dbh |
| Analysis Area | Watershed | Acres | 62,805 | 62,805 |
| | Affected Area | | 2,045 | 2,045 |
| Pre-Harvest | Snag Density | Snags/Acre | 6.8 | 1.6 |
| | Watershed | Total Snags | 427,074 | 100,488 |
| | Affected Area | | 13,906 | 3,272 |
| Post-Harvest | Affected Area | Total Snags | 11,067 | 2,659 |
| | Watershed | | 424,235 | 99,875 |
| | Difference from Pre-Harvest | | 2,839 | 613 |
| | Snag Density | Snags/Acre | 6.8 | 1.6 |

When compared to white-headed woodpecker cumulative species curves in DecAID, for the previously mentioned habitat type and structural condition, densities would continue to exceed the 80 percent tolerance level for the white-headed woodpecker in the 10-inch group and the 30 percent tolerance level in the 20-inch group.

At the watershed scale, the proposed action would not reduce snag densities in either the ≥10-inch group or the ≥20-inch group (Table W-17) in moist upland forest habitat when compared to the current condition (Table W-11). In the ≥20 inch group, snag densities in moist upland habitat would not change at the watershed scale under Alternative 4.

Table W-17. Alternative 4 Snag Densities for Pre-harvest and Post-harvest Treatment in Moist Upland Forest in the Sunflower Bacon Analysis Area (Wall Creek Watershed).

| Evaluation Areas | | Unit | Diameter Group | |
|---|---|---|---|---|
| | | | ≥ 10" dbh | ≥ 20" dbh |
| Analysis Area | Watershed | Acres | 6,387 | 6,387 |
| | Affected Area | | 12 | 12 |
| Pre-Harvest | Snag Density | Snags/Acre | 64.7 | 10.2 |
| | Watershed | Total Snags | 413,239 | 65,147 |
| | Affected Area | | 776 | 122 |
| Post-Harvest | Affected Area | Total Snags | 622 | 98 |
| | Watershed | | 413,085 | 65,123 |
| | Difference from Pre-Harvest | | 154 | 24 |
| | Snag Density | Snags/Acre | 64.7 | 10.2 |

Forest Plan standards for standing dead trees would be maintained in the watershed and analysis area scales. In the salvage portion of the analysis area, at least 4 snags per acre (2 snags ≥10 inches dbh and 2 snags ≥20 inches dbh, where available) would be retained.

Approximately 3.8 miles of temporary roads would be constructed under this alternative. Dead standing trees along and adjacent to temporary roads could be felled, reducing overall snag density.

Landscape burning within the analysis area (9,347 acres) would have similar effects as those described previously. The potential loss of dead standing trees from underburns is expected to be minimal because underburns are expected to burn at low intensities. Snag densities in underburned stands are expected to remain above Forest Plan standards (2.25 snags per acre) after treatment.

Non-commercial thinning and juniper reduction would not affect snag density.

## Cumulative effects

### Alternative 2

Past activities and events in the Sunflower Bacon analysis area that have affected snag densities include timber harvest (25,842 acres), wildfire (280 acres), private-land harvesting (approximately 1,000 acres of recent harvest), prescribed fire (8,217 acres), firewood cutting, and Tussock moth defoliation (2000-2001). Past harvest activities (Forest Service and private land harvest) throughout the analysis area has directly affected snag density through the removal of dead standing trees ≥10 inches and ≥20 inches diameter breast height. Past wildfire created snags in both diameter groups within the analysis area. Past prescribed fire likely had little impact on large snags. Smaller, shorter-lived snags likely were consumed by these activities. These activities may also have created snags through fire-caused mortality. Past firewood cutting removed snags adjacent to open roads within the analysis area, reducing the density of snags in these areas. Tussock moth infestation in 2000 and 2001 created many new snags within the Wall Creek watershed. Heavy mortality of overstory vegetation tended to be patchy. These activities have combined to create the existing condition of snag habitat in the analysis area and watershed.

Present activities that affect dead standing trees include the Rimrock project, wildfire suppression, and woodcutting. The Rimrock project is located west and south of the analysis area within the Wall Creek watershed. This project will thin approximately 5,075 acres. The Rimrock project is a green timber sale; therefore, the expected impacts on snags are expected to be minimal. Forest Plan standards for standing dead wood would be met or exceeded in thinned stands in the Rimrock analysis area following treatment. Decades of fire suppression have reshaped the landscape through fire exclusion. Historically, fire played a role in reducing heavy fuel build-up and recruiting snags on the landscape, typically in small patches. Fire exclusion interrupts deadwood dynamics on the landscape, allowing dead standing trees and downed wood to remain longer on the site, and building higher densities of dead wood on the landscape. Over time, the frequency of dead wood patches and size of patches would increase, resulting in a higher proportion of deadwood on the landscape. These patches and the surrounding landscape would become susceptible to high severity wildfire. A high intensity wildfire event would result in a reduction in existing snags. A fire of this type would also create snags. Over time, snags created by a fire of this type would fall to the ground. It would take more than 80 years to re-establish the snag component in the area and meet Forest Plan standards. Firewood cutting has the same impacts as those described previously.

Reasonably foreseeable future activities or events in the analysis area with a potential to affect dead standing wood habitat include woodcutting and the Southern Hazard Tree Salvage project. Woodcutting would continue to have the same impacts as those described previously. The Southern project would remove dead standing trees along open forest roads that pose a danger to forest users. Activities would be limited to areas adjacent to open forest roads; relatively few snags would be removed along these routes.

Based on the cumulative effects of past, present, and future actions in the analysis area, there would be a slight reduction in snag densities at the watershed and analysis area scale under this alternative. This reduction would combine with past, present, and future activities to reduce dead standing wood habitat in the Wall Creek watershed. Snag densities at both scales would continue to meet Forest Plan standards following treatment. All felling of standing dead trees (snags) would be incidental to the harvest of green trees, except in portions of units 56 and 57. Because snag densities would continue to meet Forest Plan standards following treatment, there would be no adverse effects on standing dead wood habitat or those species (primary cavity excavators) dependent on these habitat features for foraging, nesting, or roosting.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described for Alternative 2. There would be no change in snag densities at the watershed scale under this alternative. Snag densities at the watershed and analysis area scales would continue to meet Forest Plan standards following treatment. All felling of standing dead trees (snags) would be incidental to the harvest of green trees, except in portions of units 56 and 57. Because snag densities would continue to meet Forest Plan standards following treatment, there would be no adverse effects on standing dead wood habitat or those species (primary cavity excavators) dependent on these habitat features for foraging, nesting, or roosting.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described for Alternative 2. There would be no change in snag densities at the watershed scale under this alternative. Snag densities at the watershed and analysis area scales would continue to meet Forest Plan standards following treatment. All felling of standing dead trees (snags) would be incidental to the harvest of green trees, except in portions of units 56 and 57. Because snag densities would continue to meet Forest Plan standards following treatment, there would be no adverse effects on standing dead wood habitat or those species (primary cavity excavators) dependent on these habitat features for foraging, nesting, or roosting.

## Snag Replacement Trees

### *Current Condition*

Snag replacement trees are those that would provide future snag habitat in forested habitats. Snag replacement trees ensure that snags would be available for Management Indicator Species (MIS) and other snag dependent species in the long term. All of the stands proposed for treatment in this analysis are fully stocked, and meet Forest Plan (as amended) objectives for green tree replacements. A small portion of the analysis area (southern portion) was affected by the Tussock moth outbreak in 2000-2001. Forty acres in Units 56 and 57 are proposed to be salvage harvested. Examination of these units indicated that they were overstocked prior to the insect outbreak. It was also noted that a considerable proportion of the overstory in Units 56 and 57 survived the outbreak. Currently, green tree replacements are above Forest Plan objectives in all stands proposed for treatment.

## Direct and Indirect Effects

### Alternative 1

Within the next three years, green/live trees would remain available for recruitment into the snag population. Snag replacement trees (live/green) would continue to occupy the project area near current densities and size classes, exceeding Forest Plan objectives. With the existing management direction including fire suppression, mortality among live trees would continue within conifer stands within the project area.

In the mid term, the availability of replacement trees is expected to decrease due to insect and disease outbreaks. Given sufficient time, green tree replacements could be reduced below Forest Plan standards by widespread insect and disease infestations or high severity wildfire (resulting from high fuel loading). Wildfire of this type would change the composition and structure of forested stands in the analysis area. Depending on the intensity and severity of the fire, this would reduce or even eliminate green replacement trees currently occupying the site. After a severe fire event, it would take in excess of 80 to 100 years to regain sufficient quantities of replacement trees, in all size classes, to meet the Forest Plan objectives.

### Alternative 2

Proposed harvest activities (commercial and non-commercial thinning/juniper removal) would directly and indirectly affect green trees in the project area. Commercial thinning would reduce the density of green trees in the affected area for all size classes (all green trees greater than 21 inches dbh and the largest trees in each stand would be retained). At least 15.8 (16) green trees per acre greater than 10 inches diameter breast height would be retained in dry forest and moist forest habitats as snag replacement trees. This would include about 10 (10.2) trees per acre greater than 12 inches diameter breast height and 1 (1.1) tree per acre greater than 20 inches diameter breast height in the dry upland forest. All treated stands would be fully stocked after treatment; Forest Plan objectives for green tree replacements would be met in all units (including salvage portions of units 56 and 57) after treatment.

Construction of temporary roads also has the potential to affect green snag replacement trees. Approximately 4 miles of temporary road would be constructed under this alternative. It is unlikely that this activity would have a measurable effect on green tree replacements because road layout would generally avoid areas with green trees.

Low intensity underburns would reduce fuels (slash) created from harvest and thinning activities, and reduce understory vegetation. Prescribed fire could cause mortality of young green trees; however, green tree replacements are expected to remain at or above the Forest Plan standards after landscape burning and activity fuels treatment.

### Alternative 3

The environmental effects of this alternative would be similar to those described under Alternative 2. All treated stands would be fully stocked after treatment; Forest Plan objectives for green tree replacements would be met in all units (including salvage portions of units 56 and 57) after treatment.

### Alternative 4

The environmental effects of this alternative would be similar to those described under Alternative 2. All treated stands would be fully stocked after treatment; Forest Plan objectives for green tree replacements would be met in all units (including salvage portions of units 56 and 57) after treatment.

### *Cumulative effects*

#### Alternative 2, 3, and 4

Past activities and events in the Sunflower Bacon analysis area that affected snag replacement trees include timber harvest (25,842 acres), private land timber harvest (approximately 1,000 acres of recent harvest), and wildfire (280 acres). Past harvest activities reduced green tree replacements in the analysis area. Harvest has led to a high proportion of green trees less than 20 inches and a lower proportion of trees greater than 20 inches in the affected area. Wildfire also caused mortality of green trees in portions of the analysis area. These activities and events have combined to create the existing condition of green tree replacements in the analysis area. Current densities of trees in the affected area are above Forest Plan objectives for green replacement trees.

Fire suppression (past, present, and future) continues to limit the extent of fire on the landscape. Fire suppression makes the area more susceptible to high severity wildfire due to increased stand densities and fuel loading. A high intensity wildfire event like the Wheeler Point fire could result in a total loss of green trees in the project area. This would result in reductions in green replacement trees below Forest Plan objectives. It could take more than 80 years to re-establish a snag replacement tree component to the area.

No known future activities or events would have a cumulative effect on green replacement trees in the analysis area.

Based on the cumulative effects of past, present, and future actions in the analysis area, all of the stands proposed for treatment under this project meet the amended Forest Plan objectives for green tree replacements after treatment. Treatment would leave all stands fully stocked following harvest. Proposed treatments would not reduce tree densities below objectives; therefore, there would be no adverse effects on future snag densities in treatment units. Sufficient green trees would remain to provide these habitats in the future.

## Downed Wood

### *Current Condition*

Downed wood densities will not be compared to DecAID, because “no wildlife data on downed wood cover is available for this wildlife habitat type and structural condition class” (Mellen et al. 2005) used for this evaluation. Table W-18 compares the Forest Plan standards for downed wood to the existing condition in the Wall Creek watershed, based on current vegetation survey data.

Dead downed wood is dependent on disturbances that create snags and snags subsequently falling to the ground to provide downed wood habitat. Downed wood would remain on site until it decomposes or is burned up in a wildfire, resulting in reduced downed wood on the site until snag falling occurs. Downed wood occurs as scattered individuals, clusters, or piles within the analysis area. For this analysis, Current Vegetation Survey data was used to evaluate downed wood in the Sunflower Bacon analysis area and across the watershed. When compared to Forest Plan standards (as amended) for downed wood density, current estimates exceed the Forest Plan standard for the dry upland forest potential vegetation group by 10 to 13 pieces per acre (Table W-18). In the moist upland forest potential vegetation group, downed wood densities exceed Forest Plan standards by 28 to 33 pieces per acre

(Table W-18).

Table W-18. Forest Plan Standards for Downed Wood Density Compared with the Downed Wood Density in the Wall Creek Watershed

<table>
<tr><th colspan="3">Umatilla Forest Plan, (Amended 1995)</th><th colspan="3">CVS[1] Data, Wall Creek Watershed</th></tr>
<tr><th>Species Group</th><th>Minimum Log Size Criteria</th><th>Downed wood Density (pcs per acre)</th><th>Potential Vegetation Group</th><th>Minimum Log Size Criteria</th><th>Downed wood Density (pcs per acre)</th></tr>
<tr><td rowspan="3">Ponderosa Pine/South Association</td><td>Small end diameter ≥12 inches</td><td rowspan="3">3 to 6</td><td rowspan="3">Dry Upland Forest</td><td>Small end diameter ≥12 inches</td><td rowspan="3">16.3</td></tr>
<tr><td>Piece length ≥ 6 feet</td><td>Piece length ≥ 6 feet</td></tr>
<tr><td>Total length 20-40 feet</td><td>Total length 20-40 feet</td></tr>
<tr><td rowspan="3">South Association</td><td>Small end diameter ≥12”</td><td rowspan="3">15 to 20</td><td rowspan="3">Moist Upland Forest</td><td>Small end diameter ≥12”</td><td rowspan="3">48.3</td></tr>
<tr><td>Piece length >6 feet</td><td>Piece length >6 feet</td></tr>
<tr><td>Total length 100’-140‘</td><td>Total length 100’-140‘</td></tr>
<tr><td colspan="6">[1]Data from CVS plots measured in 1999 for the Wall Creek Watershed Assessment.</td></tr>
</table>

## *Direct and Indirect Effects*

### Alternative 1

In the short term (0 to 3 years), dead downed wood would continue to occupy the watershed at current densities in the dry upland and moist upland forest potential vegetation groups. These densities are currently well above Forest Plan standards. Snags would continue to be recruited and fall at existing rates. In the long term, stands would continue to develop into dense, multi-layered habitats. The incidence of insects and disease would increase in dense, overstocked stands; increased mortality (snag recruitment) in these stands would increase potential downed wood. Increases in downed wood density would also increase fuel loading and the risk of wildfire (see Fuels section). Large scale, high severity wildfire would reduce downed wood densities by consuming a portion of the existing downed wood. A fire of this type could reduce downed wood densities below Forest Plan standards immediately following the fire. Downed wood would eventually increase as snags created by a fire of this type begin to fall. After a series of wildfires, downed wood densities would likely fall below the Forest Plan standard because of the diminished source of green trees and snags. Replacing the downed wood component after a series of disturbance events could take up to 80 years to develop replacement trees greater than 12 inches dbh.

### Alternative 2

Proposed treatments would occur on approximately 3,160 acres within the analysis area. Proposed commercial and non-commercial thinning would not directly affect downed wood because downed wood would not be harvested or removed from the site by these activities. Indirectly, dead wood may be affected by harvest operations (skidding, skid trails, landings, etc.) or temporary roads, where existing down logs may be moved, cut in pieces, or broken apart. Because harvest and thinning activities would not remove downed wood from treatment units, downed wood densities would continue to exceed Forest Plan standards in the affected area following treatment.

Approximately 2,456 acres of activity fuels treatment (2,222 acres landscape burning and 234 acres mechanical) and 10,196 acres of landscape burning (includes activity fuels burning) would occur under this alternative. Burning could directly affect downed wood retained after harvest. As a result of underburning, some smaller logs (less than 16 inches) may be consumed or partially consumed. Logs with the potential to burn completely would be those in close proximity to high accumulations of slash or other fine fuels; however, the potential loss of down logs from underburning is not measurable. The timing of burning and fuel/weather conditions when burning occurs would combine to create a low intensity underburn, reducing the potential for consumption of downed wood. Underburned stands would be expected to meet or exceed Forest Plan standards for downed wood after burning. Mechanical activity fuels treatment (234 acres) would only affect fuels created by treatment activities (commercial thinning); existing downed wood would not be affected by this activity. Forest Plan standards for downed wood would be met in these units after treatment.

Thinning (non-commercial and juniper reduction) would not directly or indirectly affect dead downed wood left in the project area.

#### Alternative 3

The environmental effects of this alternative would be similar to those described under Alternative 2.

Activities would have the same effects as those described under Alternative 2; only the extent (number of acres treated) would differ between these two alternatives. Compared to Alternative 2, this alternative would treat 875 fewer acres with commercial and noncommercial thinning, treat 852 fewer acres of activity fuels (-861 acres burning and +9 acres mechanical treatment) and treat fewer acres of landscape burning (-1,579 acres). Downed wood densities in the affected area would be expected to meet or exceed Forest Plan standards in the dry upland and moist upland potential vegetation groups following treatment under this alternative.

#### Alternative 4

The environmental effects of this alternative would be similar to those described under Alternative 2.

Activities would have the same effects as those described under Alternative 2; only the extent (number of acres treated) would differ between these two alternatives. Compared to Alternative 2, this alternative would treat 399 fewer acres with commercial and noncommercial thinning, treat 399 fewer acres of activity fuels (-438 acres burning and +39 acres mechanical treatment) and treat fewer acres of landscape burning (-849 acres). Downed wood densities in the affected area would be expected to meet or exceed Forest Plan standards in the dry upland and moist upland potential vegetation groups following treatment under this alternative.

### *Cumulative Effects*

#### Alternative 2

Past activities and events in the Sunflower Bacon analysis area that have affected downed wood include harvest (25,842 acres), wildfire (280 acres), personal-use firewood collection, private-land harvesting (approximately 1,000 acres of recent harvest), and the tussock moth outbreak in 2000 and 2001. Past harvest activities, woodcutting, and wildfires in the analysis area have directly affected downed wood densities in the watershed through the removal of green trees (potential downed wood), snags, and downed logs. Personal use firewood collection reduces snag densities adjacent to open roads, reducing future downed wood recruitment. Wildfire has affected downed wood densities by consuming downed wood and causing overstory tree mortality (future downed wood). The tussock moth outbreak resulted in patches of high mortality in forested stands, creating snag habitat. In the future, snags resulting from insect mortality will contribute to downed wood densities in the analysis area. Past activities, actions, and events have combined to create the existing condition of downed wood habitat in the analysis area. Current downed wood densities are well above Forest Plan standards for downed wood.

Present and reasonably foreseeable future activities that are affecting downed wood include firewood cutting and wildfire suppression. Fuel wood harvest (snags and downed wood) occurs within 300 feet of open roads and is limited to all species other than ponderosa pine less than 24 inches at the stump (large end). This activity results in the loss of individual snags and pieces of downed wood within the analysis area. Because these activities occur on a small portion of the landscape (those areas within 300 feet of open road that are accessible to woodcutters), the effect of this activity on downed wood densities is minimal. Current fire suppression limits the extent of fire on the landscape and interrupts deadwood dynamics. Fire suppression results in heavy fuel build-up and high snag and downed wood recruitment. Over time, there could be a higher proportion of deadwood on the landscape than if fire played a more historic role on the landscape. High fuel loads increase the risk of wildfire in forested stands. A high severity wildfire event could result in a total loss of existing downed wood in the affected area and the watershed. A high severity wildfire would create a high density pulse of downed wood in the years following the fire. Over time, downed wood created by wildfire would decay or be consumed by subsequent wildfire; downed wood densities could eventually fall below Forest Plan standards in the affected area and the watershed.

Future activities and events in the watershed that may affect downed wood densities include firewood cutting, prescribed underburning (Rimrock), and the Southern Hazard Tree Salvage project. The expected effects of firewood cutting would be the same as those that are currently occurring. Prescribed underburning under the Rimrock project (approximately 30,000 acres) would affect downed wood densities within treated stands. Generally, low-intensity underburns consume small diameter fuels; larger diameter fuels may be partially consumed or charred on the outside due to higher fuel moistures. It is expected that some small diameter downed wood would be consumed during burning on forested acres under this project; larger diameter downed wood generally would not be consumed. Snags would also be created during burning. Created snags would compensate for downed wood consumed by burning in the future. The Southern project would remove hazard snags adjacent to open roads in a portion of the Wall Creek watershed. Removal of these hazard snags would reduce future downed wood recruitment adjacent to these roads; it is not expected that downed wood densities would be adversely impacted due to the size of the area affected.

Based on the cumulative effect of past, present, and future actions in the analysis area, downed wood densities would be expected to decrease slightly in response to harvest and burning. Existing downed wood densities are 2 to 4 times greater than the Forest Plan standard for this habitat feature. Densities would continue to exceed Forest Plan standards following treatment. Based on the above-mentioned cumulative effects, downed wood densities would be minimally affected by the activities proposed under this alternative; therefore, this alternative would not adversely affect downed wood densities or species known to use or depend on this habitat feature.

#### Alternative 3

The cumulative effects of this alternative would be similar to those described in Alternative 2. Downed wood densities would continue to meet Forest Plan standards following treatment. This alternative would have the least impact on downed wood densities because the fewest acres of landscape burning would occur when compared to the other action alternatives. Downed wood densities would be minimally affected by the activities proposed under this alternative; therefore, this alternative would not adversely affect downed wood densities or species known to use or depend on this habitat feature.

#### Alternative 4

The cumulative effects of this alternative would be similar to those described in Alternative 2. Downed wood densities would continue to meet Forest Plan standards following treatment. Downed wood densities would be minimally affected by the activities proposed under this alternative; therefore, this alternative would not adversely affect downed wood densities or species known to use or depend on this habitat feature.

# *SOILS*

This section incorporates by reference the Sunflower Bacon Soils Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the alternatives are discussed in this section.

## Scope of Analysis

The analysis area for soil disturbance is the existing and proposed roads, fire lines, and treatment units for the Sunflower Bacon Project in the Alder/Upper Skookum subwatershed. The analysis area for soil erosion is the Alder/Upper Skookum subwatershed. Analysis of cumulative effects will include Forest Service activities, which are believed to be currently affecting the soil resource of the human environment.

## Soil Disturbance

Soils in the Sunflower Bacon harvest treatment units were assessed using the Protocol for Assessment and Management of Soil Quality Conditions, Umatilla National Forest (2002). This document is included in Sunflower Bacon Soils Report contained in the project file.

Non-commercial thinning units and landscape prescribed burning blocks anticipated effects on soil disturbance would be low. Soil disturbance by these activities would remain within forest plan standards. For this reason the analysis of soil disturbance will focus on commercial thinning units where there is a potential for detrimental soil conditions to be affected.

### *Current Condition*

Background climatic, geologic, and soil information may be found in the Wall Ecosystem Analysis (1995). That document reported that the upper part of Bacon Sunflower project area had the greatest potential for treatable soils in detrimental condition in the Wall Creek Watershed (p. 64). It also noted that there was a need to rehabilitate shallow soil in the lower part of the Bacon Sunflower project area.

Forest Service records indicate that approximately 1,859 acres have had harvest activity three times, 7,037 acres have had harvest activity two times and 6,207 acres have had harvest activity once. An additional 2,020 acres was acquired through past land exchange processes. Forest Service records do not include the harvest information on these areas, although it is known that these areas have had harvest previous to the Forest Service acquiring these lands. The harvests were mostly partial cuts, with some commercial thinning and overstory removal. While most of the road system was developed in conjunction with harvest, Forest Service road 2202 was once a stagecoach road.

The commercial thin units proposed for harvest were field checked using the Protocol for Assessment and Management of Soil Quality Conditions, Umatilla National Forest (2002). Based on this field review, eight units were chosen for follow-up examination, due to indication of higher residual soil disturbance levels. This disturbance is the result of previous harvest activities. The current conditions observed are shown in Table S-1. Units were grouped into three ranges (0-10 percent, 11-20 percent, and >20 percent) of existing detrimental soil condition (DSC) as a percentage of area based on the field assessments. Table S-1 summarizes the individual unit percentages into the 3 group ranges and acres in each category. The mid-point of the range (e.g. 5 percent for the 0-10 percent group) was used to calculate acres in DSC and for establishing a percentage by unit for use in effects changes. This (use of midpoint for calculating) would tend to overestimate acres in DSC, especially in units with little to no existing DSC, but is useful for comparing relative starting points and effects of actions for cumulative effects assessment (Busskohl, 2006).

Table S-1, Existing Soil Condition in Activity Areas Proposed in Alts 2, 3, and 4.

| | Activity Area Detrimental Soil Conditions | | | | |
|---|---|---|---|---|---|
| | 0-10% | 11-20% | >20% | total units/acres | percent of analysis area |
| Existing Conditions | | | | | |
| (alt 2 existing acres DSC) | 125 | 64 | 5 | 194 ac | 7% |
| (alt 3 existing acres DSC) | 86 | 41 | 0 | 127 ac | 7% |
| (alt 4 existing acres DSC) | 107 | 64 | 0 | 171 ac | 7% |

Of the units proposed in Alternative 2, there are detrimental soil conditions on 194 acres, and one proposed unit has 5 acres which exceed the Forest Plan standard. The 194 acres are approximately 7 percent of the analysis area, and include the existing road system. Alternatives 3 and 4 have fewer acres that have detrimental soil conditions, and no proposed units that exceed the Forest Plan standard.

The Wall Ecosystem Analysis estimated that the Upper Little Wall subwatershed had the greatest potential for soils in detrimental condition in the Wall Creek Watershed (p. 64). It recommended treatment of deeper, compacted soils by subsoiling to reduce soil compaction, aid hydrologic function, and improve establishment and growth of tree regeneration. The subsoiling would be done when specific treatable areas were found.

It also noted that there was a need to rehabilitate shallow soil in the Lower Little Wall subwatershed (p. 64). Revegetation with native species helps shallow soils, but subsoiling is not recommended for them. Shallow scarification is typically appropriate to create a more favorable seed bed.

## Direct and Indirect Effects

### Alternative 1

Pre-analysis screening and examination located approximately 194 acres of detrimental soil disturbance in proposed units for Alternative 2. This is equivalent to approximately 7 percent of the analysis area (Table S-1). Under Alternative 1, the detrimental soil levels would remain the same as they are now.

### Alternative 2

Detrimental soil disturbance is expected to increase with this alternative (Table S-2). The soils in detrimental condition would recover at different rates, based on the impacts which caused them and whether they are rehabilitated.

Table S-2, Expected Increases in DSC Ranges by Alternative

| Alternative | 0-10% | 11-20% | >20% | total units/acres | percent of analysis area |
|---|---|---|---|---|---|
| Alternative 2 | | | | | |
| Number of units: | 10 | 56 | 11 | 77 units | |
| Total acres DSC: | 21 | 265 | 107 | 393 ac | 15% |
| Alternative 3 | | | | | |
| Number of units: | 6 | 44 | 7 | 57 units | |
| Total acres DSC: | 8 | 182 | 62 | 252 ac | 14% |
| Alternative 4 | | | | | |
| Number of units: | 9 | 50 | 10 | 69 units | |
| Total acres DSC: | 20 | 227 | 99 | 346 ac | 15% |

This includes effects of harvest, mechanical and combustion fuel treatments of activity fuels, temporary road construction, and mechanical fire lines. Total units/acres of DSC by alternative are based on the total area of commercial thinning. The total area of commercial thinning varies by alternative. Commercial thinning units not included in the respective alternative are not included in calculating DSC acres.

Alternative 2 proposes to commercial thin 1,514 acres with two machines making single passes over the area. It also proposes to commercial thin and treats slash on 942 acres with three passes. Interpreting the Monitoring Report from the Draft Owens Fuels Trial Project (2006), 30 miles northeast of the Sunflower Bacon area and on similar soils and other recent projects indicate that detrimental soil disturbance would be expected to increase by 3-8 percent after 2 passes with heavy equipment. It would be expected to increase by an additional 1-4 percent with a third pass. The areas with detrimental soil conditions would be expected to be isolated within units where multiple skid trails converge. For this project's activities, estimates were used to evaluate effects. Harvester-forwarder systems were assigned a 4.5 percent increase in DSC, whole tree yarding systems were assigned 6 percent, and mechanical fuel treatment was assigned an additional 2.5 percent.

Units in which the activity fuels would be burned instead of mechanically treated were assigned an additional 2 percent increase in DSC. The soils with increased DSC are expected to be located in non-continuous patches. DSC in prescribed burning is due to the exceedence of high burn severity criteria (See Protocol for Assessment and Management of Soil Quality Conditions, UNF, 2002 or Forest Plan).

Expected increases in detrimental soil conditions from burning were estimated using results from Forest Monitoring (2005 Forest Plan and Best Management Practice Monitoring Report).

Five and one half miles of mechanical fire lines and 4.0 miles of wet line or hand line would be constructed around units before burning. The mechanical fire line is expected to be approximately 4 feet wide, and to be 100 percent detrimental, because of the displacement of top soil. The 4.0 miles of hand line and wet line are not expected to have any effect on soil.

Alternative 2 also proposes to under burn 10,196 acres of landscape fuels. The approximately 288 acres of detrimentally affected soil resulting from under burning are expected to begin growing moss in 1-3 years. Vascular plants would begin to appear in 3-5 years, possibly sooner if re-sprouting roots are present. Because of the isolated nature of DSC in prescribed burns, it is not usually necessary to rehabilitate them. The 9,890 acres which were not detrimentally affected by burning would “green up” with grass and shrub growth in a few weeks.

The areas detrimentally affected by commercial thinning and non-commercial thinning with slash busting or juniper eradication with slash busting are expected to be the landings and the main skid trails as they approach the landings. Landing and skid trail areas tend to be compacted and rutted. Such areas begin to recover in approximately 5 years, but, without rehabilitation, may take decades to fully recover from compaction.

Table S-3, Proposed Detrimental Soil Rehabilitation

| Alternative | Existing DSC >20% | DSC >20% after harvest | DSC >20% after rehab |
|---|---|---|---|
| 2 | 5 acres | 35 acres | 0 acres |
| 3 | 0 acres | 19 acres | 0 acres |
| 4 | 0 acres | 31 acres | 0 acres |

This project proposes to rehabilitate treatment units as necessary to bring them within Forest Plan standards. Approximately 35 acres would be rehabilitated under Alternative 2. Rehabilitation would focus on temporary roads, landings and main skid trails. Possible rehabilitation actions would include subsoiling, scarifying, or other tillage (depending on soil type and depth), recontouring, replacement of displaced soil, soil amendments, seeding with native seed, and mulching. After rehabilitation treatments, these areas would be expected to return to approximately 80 percent productivity within a year (Froehlich, et al., 1983). The mechanical fire lines are expected to be bare for 1 week to 3 years, depending on number of soil horizons which are displaced. When they are built during dry conditions with a low ground pressure machine, compaction is not usually a problem. Fire lines which need treatment would be lightly scarified and seeded with 4-wheeler based equipment.

Based on past experience, the rehabilitation proposed in this alternative is expected to be effective at reducing detrimental soil conditions and meet Forest Plan standards and guidelines.

#### Alternative 3

The effects on soil disturbance for the machine passes are similar to those described in Alternative 2. The effects of burning are similar to those described in Alternative 2.

Expected increases in detrimental soil conditions for this alternative, based on the number of passes by heavy equipment, were estimated using results from the Draft Owen’s Fuels Monitoring Report (2006). Expected increases from burning were estimated using results from the 2005 Forest Plan and Best Management Practice Monitoring Report. Estimates are shown in Table S-1. All units within the analysis area with DSC above the Forest Plan standard would be rehabilitated to an acceptable level of productivity. This recovery would be similar to that described in Alternative 2.

#### Alternative 4

The effects on soil disturbance for the machine passes are similar to those described in Alternative 2. The effects of burning are similar to those described in Alternative 2.

Expected increases in detrimental soil conditions for this alternative, based on the number of passes by heavy equipment, were estimated using results from the Draft Owen's Fuels Monitoring Report (2006). Expected increases from burning were estimated using results from the 2005 Forest Plan and Best Management Practice Monitoring Report. Estimates are shown in Table SS. All land within units in the analysis area with DSC above the Forest Plan standard would be rehabilitated to an acceptable level of productivity. This recovery would be similar to that described in Alternative 2.

### *Cumulative Effects*

#### Alternative 2

Approximately 194 acres of analysis area soils were found to be in a detrimentally disturbed condition from past timber harvest and road construction. Of these, one treatment unit has approximately 5 acres exceeding Forest Plan Standards. Alternative 2 proposes actions which are estimated to increase the area of disturbance from approximately 194 acres to approximately 393 acres. The area of detrimentally disturbed soil (DSC), in excess of Forest Plan standards, would increase from 5 acres to 35 acres. All of the 35 acres would be rehabilitated with appropriate treatments within 10 years of the beginning of this project. Based on past experience, the rehabilitation proposed in this alternative is expected to be effective at meeting Forest Plan standards and guidelines for maintaining and improving soil productivity.

#### Alternative 3

Approximately 127 acres of analysis area soils were found to be in a detrimentally disturbed condition from past timber harvest and road construction. Of these, there are no acres exceeding Forest Plan Standards. Alternative 3 proposes actions which are estimated to increase the area of disturbance from approximately 127 acres to approximately 252 acres. The area of detrimentally disturbed soil (DSC), in excess of Forest Plan standards, would increase from 0 acres to 19 acres. All of the 19 acres would be rehabilitated with appropriate treatments within 10 years of the beginning of this project. Based on past experience, the rehabilitation proposed in this alternative is expected to be effective at meeting Forest Plan standards and guidelines for maintaining and improving soil productivity.

#### Alternative 4

Approximately 171 acres of analysis area soils were found to be in a detrimentally disturbed condition from past timber harvest and road construction. Of these, there are no acres below Forest Plan Standards. Alternative 4 proposes actions which are estimated to increase the area of disturbance from approximately 171 acres to approximately 346 acres. The area of detrimentally disturbed soil (DSC), in excess of Forest Plan standards, would increase from 0 acres to 31 acres. All of the 31 acres would be rehabilitated with appropriate treatments within 10 years of the beginning of this project. Based on past experience, the rehabilitation proposed in this alternative is expected to be effective at meeting Forest Plan standards and guidelines for maintaining and improving soil productivity.

# Soil Erosion

## Current Condition

Exposed soil resulting from land management is primarily located in the road system, which cover 104 miles or 250 acres. The minor locations of exposed soil are approximately 3 acres of cattle trails and range improvements and 2 gravel pits which cover 1 acre. The exposed soil in the roads is the main source of erosion in the analysis area.

There are 104 miles of roads in the analysis area. The analysis area is 34.5 square miles, so the road density is 3.0 miles of roads per square mile of area. The Heppner Ranger District average road density is 2.9 miles per square mile. The lower part of the Sunflower Bacon project area has the highest road density in the Wall Creek Watershed (Wall Ecosystem Analysis, p. 84).

The riparian area is 5.85 square miles, and there are 33 miles of roads in riparian areas. The riparian road density is 5.64 miles of roads per square mile of riparian area.

## Direct and Indirect Effects

### Alternative 1

Existing roads would remain at 104 miles or 250 acres of exposed soil, and cattle trails, range improvements, and gravel pits would remain at 4 acres of exposed soil (Table S-4). There is a total of 254 acres of soil exposure out of 22,102 acres of analysis area (sub-watershed).

Road density in the analysis area would remain at 3.00 miles of road per square mile of analysis area. This figure includes known roads on private land. The county roads (21, 22, and 2120), which have a length of 11 miles, have received periodic maintenance, and it is assumed this would continue. The other 93 miles of open, closed, and seasonal roads would not be maintained, and would continue to be used in a deteriorating condition. The deterioration involves erosion of fine material from the road surface by running water. The erosion adds fine sediment and turbidity to the stream system.

Riparian road density would remain at 5.64 miles of road per square mile of analysis area. Existing riparian roads, including open, closed, seasonal, and non-system roads would continue to constrict flood plains in the area. This increases stream bank instability and sediment production above the level it would be if the roads had not been constructed.

Fire prone timber stands line the riparian areas and continue the risk that wildfire would cause erosion that would increase stream sediment and turbidity. For Alternative 1, the soil erosion indicators would not change.

Table S-4. Existing Effects From Past and On-going Activities.

| Activity | Exposed Acres |
|---|---|
| FS, county, private roads | 250 |
| Forest Service Grazing | 3 |
| Gravel Pits | 1 |
| Total Existing | 254 |

### Alternative 2

The whole tree yarding system of timber harvest is proposed for 1,747 acres under this alternative. This system suspends the large end of the tree and drags the small end from the stump to the landing. Dragging exposes soil in the middle of the skid trail. Yarding machinery tracks and wheels also expose soil in the skid trails. Based on past experience with this system, it is expected that 4-8 percent of the units would have exposed soil after harvest. For this analysis, a mid-range figure of 6 percent is used. The estimated soil exposure from whole tree yarding is approximately 105 acres. This soil exposure would be continuous along skid trails and in landings. The soil exposure has the potential to cause erosion in the period between harvest and regrowth of vegetation.

The cut-to-length harvest system is proposed for 709 acres. This system limbs the trees and cuts them into logs at the stump, then carries the suspended log to the landing. Because the log is suspended, there is less soil exposure. Based on past experience, it is expected that 3 to 6 percent of the units would have exposed soil after harvest. For this analysis, a mid-range figure of 4.5 percent is used. The estimated soil exposure from Alternative 2 cut to length harvest is approximately 32 acres. This soil exposure occurs intermittently along skid trails and landings, because slash and logging debris in the trails protect the soil surface.

Mechanical fuel treatments are prescribed for 234 acres of the harvest units. These are expected to expose the mineral soil on 1 to 4 percent of the area. Using the mid-range figure of 2.5 percent soil exposure results in an estimate of 6 acres of exposed soil from the mechanical fuel treatments.

The greatest potential for erosion from the harvest and fuel treatments is in the whole tree yarding units, because the exposed soil is continuous in the skid trails. This potential exists for a relatively short time, from treatment until the next growing season when grass and forbs would be expected to resprout. The potential is reduced by slash, needles and forest litter which are continuously shed by the trees. It is also reduced by using Best Management Practices such as Limiting the Operating Period (T-5), Streamside Management Unit Designation (T-7), Stream course Protection (T-8), Determining Tractor Logging Ground (T-9), Log Landing Location (T-10), and Tractor Skid Trail Location and Design (T-11). The potential for erosion still exists, but is greatly reduced by the limited duration of time between treatment and regrowth of grass, the shedding of forest litter, and the use of Best Management Practices.

Alternative 2 proposes to construct approximately 4.0 miles of temporary roads, temporarily increasing road density from 3.00 miles per square mile to 3.13 miles per square mile for five years. After use, the temporary roads would be decommissioned.

The decommissioning process changes the road from a transportation facility to resource production (Road Analysis, 2005). As road density and area increase and then return to the existing level, there is a risk that soil erosion could occur. This risk would be mitigated by Best Management Practices.

In order to haul logs, 41 miles of existing Forest Service roads would receive maintenance and reconstruction. Blading restores the road's profile, which allows water to drain off, rather than flow down roads. Blading loosens the hardened road surface and redistributes gravel onto the travel way. Blading decreases flow channels in roads for a period of 3-5 years, which decreases road surface erosion. However, loosening the compacted road surface makes more fine material available for erosion, until this material has settled, usually 1 day to 1 month. The maintenance of cleaning ditches and culverts removes accumulated fine sediment and places it where it is unlikely to enter streams.

Riparian road density would increase from 5.64 miles per square mile to 5.68 miles per square mile for 5 years because of the temporary roads. After the project is complete (5 years), the roads would be decommissioned, and the road density would return to 5.64 miles per square mile. Both construction and decommissioning in riparian areas increases the risk of soil erosion. This risk would be mitigated by Best Management Practices.

Some of the roads which would be maintained are in riparian areas. This maintenance causes an overall reduction in the amount of fine sediment that enters streams, and does not affect bank stability.

Alternative 2 proposes landscape prescribed burning for 10,196 acres. Forest Plan monitoring on the South Zone of the Umatilla National Forest has found that prescribed under burning resulted in exposed mineral soil on less than 3 percent of burned units. The areas of exposed mineral soil were not found to be continuous (2005 South Zone Forest Plan Monitoring Report). Because the areas of exposed soil were small, and were not continuous, any resulting erosion would be localized.

In addition, 5.5 miles of mechanical fire line and 4.0 miles of hand line or wet line would be constructed to contain the burns. However, it is not planned for construction in riparian areas. Monitoring in 2005 found that mechanical fire lines sometimes wandered a short distance into riparian areas, but erosion from them was always well buffered, and never reached a stream. Mechanical fire lines would be further mitigated by water bars and seeding.

The 4.0 miles of hand line and wet line is not expected to have any impacts on soil, because hand line is approximately 18 inches wide, and would leave some of the organic horizons and top soil in place. Hand line is of short duration, and typically re-sprouts within a few weeks, or after the first rains. Wet line is of very short duration, and is only used as the fire front is passing. Wet line is applied by hose, and dries out in a few hours. The erosion indicators are summarized in Table S-5.

#### Alternative 3

The effects of Alternative 3 on the potential for soil erosion are similar to that described in Alternative 2. Activities with the potential to cause soil erosion under alternative 3 are the harvest and mechanical fuel treatments, the temporary increase in road density, installation of 2 culverts on the 2120-140 road, reconstruction of 7 miles of existing roads, construction of 7.0 miles of mechanical fire line and 6.5 miles of hand line or wet line, and landscape prescribed burning on 8617 acres including 13 acres of whole tree yarding piles burned. These actions increase the potential for erosion as shown in Table S-5. Actions which reduce the potential for erosion include no temporary road construction in riparian areas and closing the 2120-070. Closing the 2120-070 road would reduce the density of open roads, but would not affect the overall road density or the riparian road density, because closed roads are considered to function hydrologically the same as open roads. Closing roads does decrease the rate of deterioration, thus reducing the potential for soil erosion from the road.

#### Alternative 4

The effects of Alternative 4 on the potential for soil erosion are similar to those described in Alternative 2. Activities with the potential to cause soil erosion under alternative 4 are the harvest and mechanical fuel treatments, the temporary increases in road density and riparian road density, installation of 2 culverts on the 2120-140 road, reconstruction of 7 miles of existing roads, construction of 4.8 miles of mechanical fire line and 5.7 miles of hand line or wet line, and landscape prescribed burning on 9347 acres including 14 acres of whole tree yarding piles burned. These actions increase the potential for erosion as shown in Table S-5.

The action which has the potential to reduce erosion is closing the 2120-070. Closing the 2120-070 road would reduce the density of open roads, but would not affect the overall road density or the riparian road density, because closed roads are considered to function, hydrologically, the same as open roads.

Closing roads does decrease the rate of deterioration, thus reducing the potential for soil erosion from the road.

## *Cumulative Effects*

### Alternative 2

Proposed harvest and mechanical fuel treatments are expected to increase exposed soil with the potential to erode from 254 acres to 397 acres. These proposed soil exposing activities are not expected to result in erosion because the activities would not occur within riparian areas. Temporary road construction and maintenance in riparian areas would be mitigated with BMPs. Road density would increase from 3.00 miles per square mile to 3.13 miles per square mile for 5 years and then return to 3.00 after decommissioning of temporary roads. Riparian road density would also increase temporarily from 5.64 to 5.68 miles per square mile. Road maintenance would occur on 41 miles of roads. The 2120-070 road would remain seasonally open. The other proposed soil exposing activities are not expected to result in erosion, because they are not continuous or are located outside of riparian areas.

Other potential sources of erosion are 4 acres of cattle trails, range improvements and gravel pits. In the future, county roads (21, 22, and 2120), which have a length of 11 miles, are expected to receive periodic maintenance as they have in the past.  This action would preserve these roads from deterioration, and maintain water quality in the nearby streams.

The soil erosion indicators for these activities are shown in Table S-5.

On-going and future activities, such as fire suppression, recreation, fire wood cutting, and mushroom collection are not expected to affect soil exposure or erosion. The increases in soil exposure for the action alternatives are less than 2 percent of the area, and are well within the Forest Plan standards for effective ground cover.

Table S-5.  Cumulative Comparison of Alternatives.

| Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Soil Erosion Potential | 254 acre | 397 acre | 346 acre | 380 acre |
| Road Density | 3.00 mi/sq mi | 3.13 mi/sq mi | 3.08 mi/sq mi | 3.11 mi/sq mi |
| Road Maintenance and Reconstruction | | 41 Miles | 40 Miles | 41 Miles |
| Riparian Road Density | 5.64 mi/sq. mi. | 5.68 mi/sq mi | 5.64 mi/sq. mi. | 5.65 mi/sq. mi. |
| 2120-070 | seasonally open | seasonally open | closed | closed |

*Road density is expressed in miles of roads per square miles of analysis area.  Excess significant figures to right of decimal included to illustrate differences between alternatives.

### Alternative 3

Proposed harvest and mechanical fuel treatments are expected to increase exposed soil with the potential to erode from 254 acres to 346 acres.  These proposed soil exposing activities are not expected to result in erosion because the activities would not occur within riparian areas. Temporary road construction and maintenance in riparian areas would be mitigated with BMPs.  Road density would increase from 3.00 miles per square mile to 3.08 miles per square mile for 5 years and then return to 3.00 after decommissioning of temporary roads. Riparian road density would be unchanged at

5.64 miles per square mile. Road maintenance would occur on 40 miles of roads. The 2120-070 road would be closed. The other proposed soil exposing activities are not expected to result in erosion, because they are not continuous or are located outside of riparian areas.

In the future, 11 miles of county roads (21, 22, and 2120) are expected to receive periodic maintenance, as they have in the past. This action would preserve these roads from deterioration, and maintain water quality in the nearby streams. Other potential sources of erosion are 4 acres of cattle trails, range improvements and gravel pits. The soil erosion indicators for these activities are shown in Table S-5.

On-going and future activities, such as fire suppression, recreation, fire wood cutting, and mushroom collection are not expected to affect soil exposure or erosion. The increases in soil exposure for the action alternatives are less than 2 percent of the area, and are well within the Forest Plan standards for effective ground cover.

#### Alternative 4

Proposed harvest and mechanical fuel treatments are expected to increase exposed soil with the potential to erode from 254 acres to 380 acres. These proposed soil exposing activities are not expected to result in erosion because the activities would not occur within riparian areas. Temporary road construction and maintenance in riparian areas would be mitigated with BMPs. Road density would increase from 3.00 miles per square mile to 3.11 miles per square mile for 5 years and then return to 3.00 after decommissioning of temporary roads. Riparian road density would also increase temporarily from 5.64 to 5.65 miles per square mile. Road maintenance would occur on 41 miles of roads. The 2120-070 road would be closed. The other proposed soil exposing activities are not expected to result in erosion, because they are not continuous or are located outside of riparian areas.

In the future, 11 miles of county roads (21, 22, and 2120) are expected to receive periodic maintenance as they have in the past. This action would preserve these roads from deterioration, and maintain water quality in the nearby streams. Other potential sources of erosion are 4 acres of cattle trails, range improvements and gravel pits. The soil erosion indicators for these activities are shown in Table S-5.

On-going and future activities, such as fire suppression, recreation, firewood cutting, and mushroom collection are not expected to affect soil exposure or erosion. The increases in soil exposure for the action alternatives are well within the Forest Plan standards for effective ground cover.

## *WATER*

This section incorporates by reference the Sunflower Bacon Hydrology Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the alternatives are discussed in this section.

### Scope of Analysis

The scope of this analysis is the Alder/Upper Skookum subwatershed, (HUC 170702020802). Analysis of cumulative effects will include Forest Service activities and those activities that have occurred on private land, which are believed to be currently affecting the water resource of the human environment. Projections of cumulative effects are made for 16 years into the future.

## Sediment

### Current Condition

Un-maintained roads erode more than new or recently maintained roads. Periodic road maintenance reduces, but does not eliminate erosion. The indicator for this erosion is road density in the analysis area. Road density is currently 3.00 miles of roads per square mile of analysis area (104 miles of FS, state, county, and including 4 miles of private roads/34.5 square miles including all ownership in sub-watershed).

In addition to the above, roads built in riparian areas narrow the effective flood plain, which decreases stream sinuosity and channel length. Since the same amount of water must run off through shorter channels, stream velocity increases, resulting in increased stream energy. In areas with shallow bedrock, the increased energy is expended by eroding susceptible stream banks. This causes wider, shallower streams, which carry more sediment/turbidity than they would if the roads had not been constructed. The indicator for this stream bank erosion is riparian road density. The riparian road density is 5.6 miles of road per square mile of Forest Service managed riparian area (33 miles/5.9 square miles). Upper Little Wall Creek has the highest riparian road density in the Wall Creek Watershed (Wall Ecosystem Analysis, 1995, p. 85).

Road crossings of streams are often the places where eroded soil enters the water. There are 183 stream crossings (of FS and county roads) on the portion of the analysis area managed by the Forest Service.

### Direct and Indirect Effects

Sedimentation is not a major concern in the Sunflower Bacon project area based on several factors:

- Project design and implementation considered areas where possible effects could occur and measures of avoidance are implemented (see project design elements and best management practices).
- Monitoring of recent projects indicated that stream buffers are 100% effective.
- Monitoring of prescribed burns indicated that soils are not detrimentally affected on at least 96% of the area.
- Approximately forty miles of roads would receive maintenance, reducing existing road degradation caused erosion.

Even though sedimentation is not a major concern in the action alternatives the following measures are used to compare the environmental effects of sedimentation between each alternative:

- Road density
- Riparian road density
- Exposed soil

#### Alternative 1

Under this alternative, existing roads would remain at 104 miles or 250 acres of exposed soil, cattle trails and range improvements on public and private land would remain at 5 acres of exposed soil, gravel pits would remain at 1 acre, and recent private land harvest and pile burning would remain at 80 acres (Table H-1).

Table H-1. Existing Exposed Soil Area.

| Activity | Exposed Acres |
|---|---|
| Previous FS Harvest | |
| FS, county, private roads | 250 |
| Forest Service Grazing | 3 |
| Private Grazing | 2 |
| Private Harvest | 70 |
| Private Pile Burns | 10 |
| Gravel Pits | 1 |
| Total Existing | 336 |

Road density in the analysis area would remain at 3.00 miles of road per square mile of analysis area. The county roads (21, 22, and 2120), which have a length of 11 miles, would receive periodic maintenance. The other 93 miles of open, closed, and seasonal roads would not be maintained, and would continue to be used in a deteriorating condition. The deterioration involves erosion of fine material from the road surface by running water. This erosion adds most of the management induced sediment and turbidity to the stream system, where it may reduce the beneficial uses of the water.

Existing riparian roads, including open, closed, seasonal, and unclassified roads would continue to constrict flood plains in the area. This increases stream bank instability and sediment production above the level it would be if the roads had not been constructed. The number of stream crossings (183) would not change under this alternative.

#### Alternative 2

Alternative 2 proposes timber harvest and mechanical fuel treatment, as well as prescribed burning. The activities would cause a limited amount of soil exposure with the potential to erode. However, because of the short duration of time before vegetation is reestablished, the shedding of forest litter, the presence of logging slash, the use of Best Management Practices, and the use of riparian buffers, it is not expected that eroded soil would reach any stream.

The construction of 4.0 miles of temporary roads would temporarily increases road density from 3.00 miles per square mile to 3.13 miles per square mile and would increase the area of exposed soil by 10 acres for approximately five years. As road density increases and then returns to the existing level, there is a risk that sediment and turbidity in streams may also increase temporarily. Risk would be mitigated by Best Management Practices.

Riparian road density would increase from the existing 5.64 miles per square mile to 5.68 miles per square mile for 5 years because of the temporary roads. Both construction and decommissioning in riparian areas increases the risk of eroded soil entering streams, because of the possibility of stream bank destabilization. Risk would be mitigated by Best Management Practices.

The prescribed burning and mechanical fuel treatments proposed in Alternative 2 would reduce the intensity and rate of spread of future wildfires, thus protecting water quality.

#### Alternative 3

Construction of 2.4 miles of temporary roads would increases road density from 3.00 miles per square mile to 3.08 miles per square mile and increases the area of exposed soil by 6 acres for approximately 5 years, until the roads were decommissioned after their use. As road density increases and then returns to the existing level, there is a risk that sediment and turbidity in streams may also increase temporarily. Risk would be mitigated by Best Management Practices. Alternative 3 proposes to close the seasonally open 2120-070 road; closed roads are considered to function, hydrologically, the same as open roads.

Riparian road density would not increase with Alternative 3.

Future wildfires threaten to expose soil and increase stream sediment. The prescribed burning and mechanical fuel treatments proposed in Alternative 3 would reduce the intensity and rate of spread of future wildfires, thus protecting water quality.

#### Alternative 4

The construction of 3.2 miles of temporary roads would temporarily increase road density from 3.00 miles per square mile to 3.11 miles per square mile and increases the area of exposed soil by 8 acres for approximately 5 years, until the roads were decommissioned after their use. As road density increases and then returns to the existing level, there is a risk that sediment and turbidity in streams may also increase temporarily. Risk would be mitigated by Best Management Practices.

Riparian road density would increase from 5.64 miles per square mile to 5.65 miles per square mile for 5 years because of the temporary roads. Both construction and decommissioning in riparian areas increases the risk of eroded soil entering streams, because of the possibility of stream bank destabilization. This risk would be mitigated by Best Management Practices.

Alternative 4 proposes to close the seasonally open 2120-070 road, decreasing the rate of deterioration of this road, because less traffic means less wear and tear. By decreasing the wear and tear, future erosion and sediment from this road would increase at a slower rate.

The erosion indicators are summarized in Table H-2.

Prescribed burning and mechanical fuel treatments proposed in Alternative 4 would reduce the intensity and rate of spread of future wildfires, which would protect water quality.

### *Cumulative Effects*

#### Effects Common to all Action Alternatives

There are no effects to accumulate with the effects of past management actions. Table H-2 shows a comparison of indicators used to demonstrate differences between the alternatives.

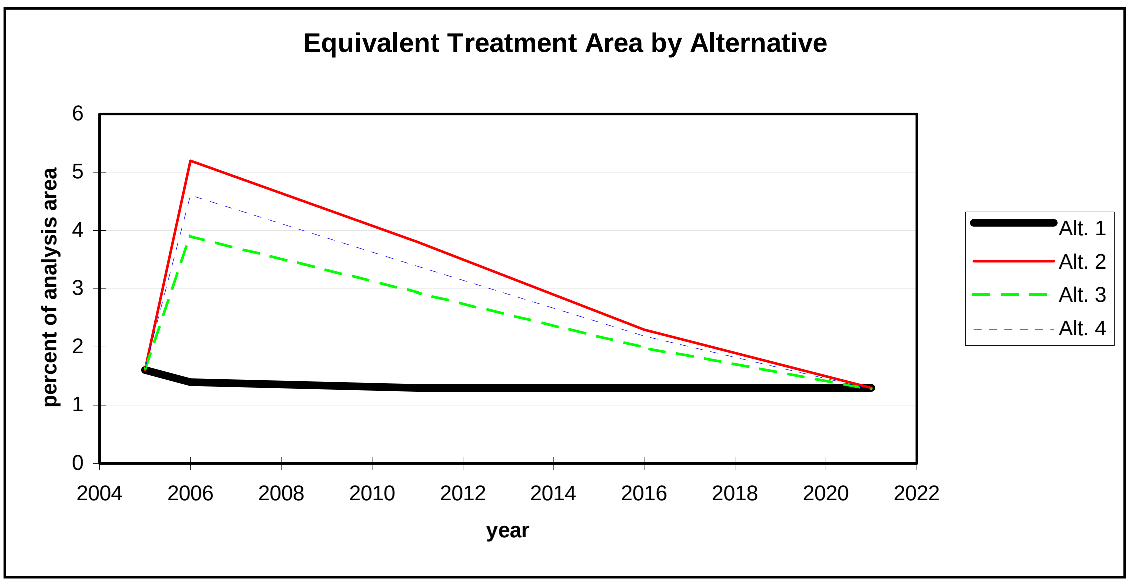
Table H-2. Indicators by Alternative.

| | alt 1 | alt 2 | alt 3 | alt 4 |
|---|---|---|---|---|
| Soil Erosion Potential | 254 acre, 1.15% | 397 acre, 1.80% | 346 acre, 1.57% | 380 acre, 1.72% |
| road density* | 3.00 | 3.13 | 3.08 | 3.11 |
| riparian road density* | 5.64 | 5.68 | 5.64 | 5.65 |
| road maintenance and reconstruction | 0 | 41 miles | 40 miles | 41 miles |
| 2120-070 | seasonally open | | closed | closed |

*Road density is expressed in miles of roads per square miles of analysis area. Excess significant figures to right of decimal are included to show differences between alternatives.

The overall condition of the analysis area was examined with the Equivalent Treatment Area model. It uses past harvest, road construction, and insect defoliation data to model the current condition, and the extent of the proposed harvest and road construction. Results were pro-rated to account for recovery over time and are expressed in acres which have not recovered hydrologically from past treatments (see Assumptions, page 8).

As of 2005, the Equivalent Treatment Area of Forest Service managed land which is affected by past harvest, road construction, and defoliation is 322 acres, or 1.6 percent of the analysis area. The area affected by these conditions is projected into the future in Chart 1. The size of the affected area gradually declines as harvest and defoliation recovers; until the year 2021, when only permanent roads affect the area hydrologically. At that time, approximately 1.3 percent of the analysis area would be affected by Forest Service management.




Chart

Figure 1. Equivalent Treatment Area on Forest Service portion of analysis area.

There are approximately 2,353 acres of private land in the analysis area. This area is roaded and had timber harvest which was completed in 2005. Harvest activities and road building on private land appear to have been more intense than on Forest Service land. An estimated Equivalent Treatment

Area for the roads and recent harvest on private land is 281 acres as of 2005. However, the private land accounts for less than 11 percent of the analysis area, so harvest there does not greatly increase overall impacts to the hydrology of the analysis area. The estimated Equivalent Treatment Area for Forest Service and private land is 591 acres, which equates to 2.7 percent of the analysis area. This Equivalent Treatment Area is the background level for this project.

Because the existing and proposed harvest and roaded part of the analysis area, including the private land, is less than 6 percent, and because effects to hydrologic parameters are not documented at less than 20 percent, it is assumed that this project would not affect water yield, peak flows, and seasonal low flows. For this reason, the hydrologic parameters will not be further analyzed in this document. Equivalent Treatment Area percentages will be used as a metric to compare the intensity of the alternatives.

The existing road system is gradually deteriorating because of a lack of maintenance. The road system, past harvest, and past grazing on public and private land is likely to be introducing more sediment and turbidity into the streams than there would be without the activities. The sediment and turbidity created by past activities is the background level for this project. This sediment load is proportionally reduced by maintenance on the 11 miles of county roads. Forest Plan grazing and harvest practices are allowing recovery on the lands managed by the Forest Service. While stream sediment and turbidity are not optimum, analysis area streams are still beneficially used for anadromous fish spawning and rearing.

Most of the analysis area is grazed by domestic livestock. Grazing issues on Forest Service land were addressed in the 1990 Forest Plan. Best Management Practices were implemented by that plan which maintain and improve stream bank stability and reduce sediment in streams (Hardman Project Water Compliance Statement, 2005). The extent of similar measures on private land is unknown.

Because of past fire suppression, most timber stands in the analysis area have changed in character to become more susceptible to wildfire. The streams in these stands are at risk of receiving sediment inputs in the event of a large wildfire.

Morrow and Grant counties are responsible for maintenance on the 11 mile county road sections of the 21, 22, and 2120. These roads have been periodically maintained in the past, and they are expected to continue to be maintained in the future. This periodic maintenance minimizes erosion from the road surfaces. The two permanent culverts on the 2120-140 road may cause a slight, short term increase in the amount of soil available to erode into streams. However, they produce a long term benefit by reducing the risk of road fill failure.

Because of past fire suppression, most timber stands in the analysis area have changed in character to become more susceptible to wildfire. The streams in these stands are at risk of receiving large amounts of sediment in the event of a large wildfire. The action alternatives include prescribed burning and mechanical treatments which would reduce the susceptibility to large wildfires. These treatments are unlikely to contribute to stream sediment and turbidity. Future fire suppression, in conjunction with periodic prescribed burning, would reduce the likelihood of fire related sediment entering streams.

#### Alternative 2

The Equivalent Treatment Area model accounts for the effects of past and proposed road construction, and timber harvest, and is used for the cumulative effects analysis.

The Existing Treatment Area model assumes that the harvest proposed for Alternative 2 would be completed in one year, and would then recover linearly for 15 years. After 15 years, the units would function hydrologically as full canopy forest.  The model also assumes that the temporary roads would be decommissioned after 5 years.

The existing condition Equivalent Treatment Area on Forest Service land for Alternative 2 is shown as 1.6 percent of the subwatershed in 2005 on Chart 1.  This rises to a high of 5.2 percent (including private land estimates, 5.8 percent) in the first year after harvest.  The Equivalent Treatment Area gradually declines to the baseline condition of 1.3 percent of the subwatershed after 15 years.  The baseline remains at 1.3 percent, which represents the area of the permanent roads.

Temporary increases in road density, riparian road density, and stream crossings may cause proportional temporary increases in stream sediment and turbidity above the background level (Soil Report).  These effects would be mitigated by the use of Best Management Practices.  Future wildfires threaten to expose soil and increase stream sediment.

There would be no change to the status of open, closed, and seasonal roads in the area.  A total of 41 miles of deteriorating roads would be maintained or reconstructed, reducing background sediment and turbidity levels for 5-10 years, until the roads return to the current level of deterioration.

#### Alternative 3

The Equivalent Treatment Area model accounts for the effects of past and proposed road construction, and timber harvest, and is used for the cumulative effects analysis.

The Existing Treatment Area model assumes that harvest proposed for Alternative 3 would be completed in one year, and would then recover linearly for 15 years.  After 15 years, the units would function hydrologically as full canopy forest.  The model also assumes that the temporary roads would be decommissioned after 5 years.

Existing condition Equivalent Treatment Area on Forest Service land for Alternative 3 is shown as 1.6 percent of the subwatershed in 2005 on Chart 1.  Equivalent Treatment Area rises to a high of 3.9 percent (including private land estimates, 4.7 percent) in the first year after harvest.  Equivalent Treatment Area gradually declines to the baseline condition of 1.3 percent of the subwatershed after 15 years.  The baseline remains at 1.3 percent, which represents the area of the permanent roads.

One mile of seasonally open road, the 2120-070, would be closed under Alternative 3, reducing the potential for road erosion.  A total of 40 miles of deteriorating roads would be maintained or reconstructed, reducing background sediment and turbidity levels for 5-10 years, until the roads return to the current level of deterioration.

This project would not affect cattle trails or range improvements in the area.  Other past activities, such as recreation, firewood cutting, mushroom gathering, and monitoring are not believed to have measurable effects to the water resource.

#### Alternative 4

The Equivalent Treatment Area model accounts for the effects of past and proposed road construction, and timber harvest, and is used for the cumulative effects analysis.

The Existing Treatment Area model assumes that the harvest proposed for Alternative 4 would be completed in one year, and would then recover linearly for 15 years.  After 15 years, units would function hydrologically as full canopy forest.  The model also assumes that temporary roads would be decommissioned after 5 years.

The existing condition Equivalent Treatment Area on Forest Service land for Alternative 4 is shown as 1.6 percent of the subwatershed in 2005 on Chart 1. Equivalent Treatment Area rises to a high of 4.6 percent (including private land estimates, 5.3 percent) in the first year after harvest. The Equivalent Treatment Area gradually declines to the baseline condition of 1.3 percent of the subwatershed after 15 years. The baseline remains at 1.3 percent, which represents the area of the permanent roads.

This project would not affect cattle trails or range improvements in the area. Other past activities, such as recreation, firewood cutting, mushroom gathering, and monitoring are not believed to have measurable effects to the water resource. Future wildfires threaten to expose soil and increase stream sediment.

## Temperature

### Current Condition

There is no definitive data regarding the extent of canopy cover in the analysis area before management began. However, it is known that during the managed period, there has been timber harvest, road construction, and foraging by cattle, elk, and deer in riparian areas which has reduced vegetation from the pre-management levels (Table H-3). Reduced shade from reduced vegetation can cause stream temperatures to increase. The indicator for riparian vegetation, which can shade a stream, is percent stream canopy cover.

Table H-3. Percent of Canopy Cover by Reach.

| Stream | Reach | | |
|---|---|---|---|
| | reach 1 | reach 2 | reach 3 |
| Bacon | 55 | 52 | |
| Little Wall | 57 | 51 | 38 |
| Lovelett | 39 | 18 | |
| Squaw | 2 | | |
| 3 Trough | 55 | | |

Data from stream survey reports.

### Direct and Indirect Effects

#### Alternative 1

The reduced riparian canopy (Table H-3) would continue to allow sunlight to reach streams and raise their temperatures. Passive restoration of the vegetation would eventually produce a canopy, but it would take approximately 100-500 years.

In the meantime, fire-prone timber stands connect the riparian areas, and increase the likelihood of wildfire causing reductions in water quality.

#### Alternative 2

In order to maintain riparian vegetation diversity, encroaching conifers would be harvested in a 4 acre quaking aspen stand (unit 18). This action would reduce stream shade for approximately 8-12 years, until the existing aspen clone had re-sprouted enough to occupy the space. The aspen stand is located on an unnamed class 4 stream which usually dries up in May. Because of the relatively small area of the aspen stand, compared to the drainage area of the stream, and because of the relatively early dewatering of the stream, it is not expected that the temperature would be affected in the short term. Over the long term, the aspen stand is expected to rejuvenate and expand into the surrounding area and eventually increase stream shade. Temporary road construction and road maintenance would cut small trees and shrubs growing in the rights-of-way. This would slow the recovery of vegetation growing in riparian areas. However, the reduction in vegetation would not measurably change the percent of existing canopy cover, which in turn would not measurably affect temperature.

#### Alternative 3

The aspen stand described in Alternative 2 is also treated in this alternative. The only other activities in riparian areas would be maintenance of existing roads. This action is not expected to affect the riparian canopy or stream temperature.

#### Alternative 4

The aspen stand described in Alternative 2 is also treated in this alternative. Temporary road construction and road maintenance would cut small trees and shrubs growing in the rights-of-way. This would slow the recovery of vegetation growing in riparian areas. However, the reduction in vegetation would not measurably change the percent of existing canopy cover or stream temperature.

### *Cumulative Effects*

#### Effects Common to all Action Alternatives

On both Forest Service and private land, riparian vegetation has been diminished by past harvest, road construction, and grazing by cattle and wildlife in riparian areas. The percent of canopy cover (Table H-4) is lower than it would be in the absence of those actions. The potential canopy would be in the 50 to 80 percent range. Also, the existing canopy is deficient in mature, reproducing populations of certain keystone species, such as black cottonwood, quaking aspen, black hawthorne, red-osier dogwood, mountain alder, willow and serviceberry (Forest botanist, 12/21/05). Ponderosa pine is reproducing, but there is a lack of mature trees. Low canopy cover is related to high stream temperatures during the low flow season. It is likely that temperatures in these streams are higher than they would be if the canopy had not been reduced.

All of the action alternatives propose to treat a riparian quaking aspen stand in order to support riparian vegetation diversity. This action would reduce shade on an unnamed class 4 stream for approximately 8 to 12 years, until the existing aspen clone had resprouted enough to occupy the space. Over the long term, the stand is expected to rejuvenate and expand into the surrounding area and eventually increase stream shade.

Grazing issues on Forest Service land were addressed in the 1990 Forest Plan. That plan implemented Best Management Practices, which have been effective at increasing riparian vegetation and shade. It is not known if similar measures have been taken on private land.

Because of the 1995 amendment to the Forest Plan known as PACFISH, timber harvest in riparian areas of Forest Service land has been virtually eliminated. It appears that timber harvest is still permitted in riparian areas on private land, which reduces the likelihood that the canopy would fully recover in that part of the analysis area.

Personal fire wood and hazard tree cutting, mushroom collection, and recreational activities are on-going on the National Forest, and are unlikely to affect water quality in the analysis area.

Because of past fire suppression, most timber stands in the analysis area have changed in character to become more susceptible to wildfire. There is a risk that riparian canopies would be decreased by large wildfires. These alternatives include prescribed burning and mechanical treatments which would reduce the risk to the riparian canopy. These treatments are unlikely to decrease the riparian canopy. Future fire suppression in conjunction with periodic prescribed burning would reduce the likelihood of wildfire decreasing the riparian canopy.

#### Alternative 2

On both Forest Service and private land, the riparian canopy has been diminished in area and in species by past harvest, road construction, and over-grazing by cattle and wildlife. The area with a riparian canopy is recovering on Forest Service land. Its recovery on private land is not obvious. Riparian canopy species are not recovering on public or private land.

A few trees and shrubs would be cut during temporary road construction in riparian areas under Alternative 2. However, the amount of cutting is so small that the percent of canopy cover and current stream temperatures would not change.

#### Alternative 3

On both Forest Service and private land, the riparian canopy has been diminished in area and in species by past harvest, road construction, and over-grazing by cattle and wildlife. The area with a riparian canopy is recovering on Forest Service land. Its recovery on private land is not obvious. Riparian canopy species are not recovering on public or private land. It is likely that this trend would remain the same in the immediate future.

There would be less cutting of riparian vegetation under Alternative 3, and therefore, less change in existing riparian canopy or stream temperature than in the other alternatives. Changes in canopy or stream temperature would be so small that they would not be measurable.

#### Alternative 4

On both Forest Service and private land, the riparian canopy has been diminished in area and in species by past harvest, road construction, and over-grazing by cattle and wildlife. The area with a riparian canopy is recovering on Forest Service land. Its recovery on private land is not obvious. Riparian canopy species are not recovering on public or private land.

A few trees and shrubs would be cut during temporary road construction in riparian areas under Alternative 4. However, the amount of cutting is so small that the percent of canopy cover or the current stream temperature would not change.

## *AQUATIC*

This section incorporates by reference the Sunflower Bacon Aquatics Specialist Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the alternatives are discussed in this section.

### Scope of the Analysis

The scale used for analysis includes one sub-watershed (Alder/Upper Skookum – 170702020802). This scale was selected because effects from the proposed projects would not be distinguishable at a larger scale.

## Aquatic Habitat

## Water Temperature

### *Current Conditions*

The Sunflower Bacon Vegetation Management analysis area contains approximately 126 miles of streams (Table A-1). The vast majority of these streams go dry in the summer, but several of them still retain fish in pools scattered throughout the stream.

Table A-1. Miles of stream within the Sunflower Bacon Vegetation Management analysis area.

| Subwatershed | Miles of fish- bearing streams (Class 1,2) | Miles of perennial, non-fish-bearing streams (Class 3) | Miles of intermittent streams (Class 4) | Total Stream Miles |
|---|---|---|---|---|
| Alder/Upper Skookum | 23.7 | 6.1 | 95.9 | 125.7 |

Water temperatures at several locations within the analysis area have been recorded since 1992. The 7-day maximum daily water temperature for each monitoring site within the analysis area is displayed in Table A-2 below. Over the period from 1992-2004, the 7-day moving average of maximum daily water temperatures at active sites within the analysis area have varied from 60 to 84 degrees Fahrenheit.

Table A-2. 7-day maximum water temperatures at active monitoring sites within the analysis area.

| Year Data Collected | Sample Sites | | | |
|---|---|---|---|---|
| | Bacon Cr. @ FS boundary | Three Trough Canyon. @ FS bdy. | Little Wall Cr above Skookum | Little Wall Cr above One Trough |
| 1992 | No Data | No Data | No Data | No Data |
| 1993 | 77 | 71 | No Data | No Data |
| 1994 | No Data | No Data | No Data | No Data |
| 1995 | No Data | No Data | 73e | No Data |
| 1996 | No Data | No Data | 75 | No Data |
| 1997 | No Data | No Data | 84 | 74 |
| 1998 | 66 | 73 | No Data | 76 |
| 1999 | 65 | 71 | 75 | 72 |
| 2000 | 61 | 71 | 73 | 72 |

| | | | | |
|---|---|---|---|---|
| 2001 | 64 | 68 | 78 | 74 |
| 2002 | 60 | 70 | No Data | 76 |
| 2003 | 65 | 71 | No Data | 72 |
| 2004 | 61 | 69 | 74 | 77 |

High water temperatures within the analysis area are likely having negative impacts on fish. Water temperatures at the Little Wall and Three Trough monitoring sites commonly exceed temperatures ideal for the survival and growth of juvenile and adult salmonids, although Bacon Creek typically does not exceed limits. Redband trout/steelhead trout require temperatures in the range of 57°-64° F during migration and rearing (Bell 1986, Beschta 1987). Portions of all of these creeks are dry in the summer months and low flows may contribute to the higher stream temperatures.

## *Direct and Indirect Effects*

### Alternative 1

Because fuels would remain untreated under this alternative, there could be indirect effects to stream temperatures should a large wildfire burn over riparian areas. Loss of shade providing trees adjacent to streams would directly increase stream temperatures. Indirectly, more sediment could increase width-to-depth ratios, which would raise stream temperatures by increasing the surface area exposed to solar radiation. No other additional activities would occur that may affect stream temperatures.

### Alternative 2

No harvest activities would occur within RHCAs with the exception of one aspen stand, unit 18. Skidding through riparian areas would be done where no shade providing vegetation exists so no additional loss of shade would occur. Stands to be treated are not located directly on stream channels, though unit 18 is within an Riparian Habitat Conservation Area, treatment of unit 18 would not result in a change to stream temperatures.

Proposed underburning, while not ignited in riparian areas, could back into them and remove some riparian vegetation that currently provides shade. However, since the backing fire would be used in controlled conditions, vegetation loss near streams is unlikely. Overall vegetation mortality in riparian areas should be low and vegetation that does burn would be expected to recover quickly. Shrubs and grasses would recover by the following year and seedlings, the size of tree most likely to be affected, would recover in 3-5 years.

Up to 732 acres of RHCAs along fish bearing streams would be included in the landscape burning. An additional 51 acres will occur in RHCAs of perennial non-fish bearing streams and 1,063 acres of RHCAs along intermittent streams would be included in the landscape burning. Existing roads would aid in retaining riparian vegetation in some areas by providing a break in fuels so that the applied fire cannot back into the riparian area.

### Alternative 3

The effects of alternative 3 would be similar to alternative 2 with changes in the area where prescribed fire may back into riparian areas. Up to 622 acres of RHCAs along fish bearing streams would be included in the landscape burning. An additional 51 acres would occur in RHCAs of perennial non-fish bearing streams and 955 acres of RHCAs along intermittent streams would be included in the landscape burning. Existing roads would aid in retaining riparian vegetation in some areas by providing a break in fuels so that the applied fire cannot back into the riparian area. Approximately 6.5 miles fewer RHCAs would be included in underburn units.

#### Alternative 4

The effects of alternative 4 would be similar to alternatives 2 and 3 with changes in the area where prescribed fire could back into riparian areas. Up to 665 acres of RHCAs along fish bearing streams would be included in the landscape burning. An additional 51 acres would occur in RHCAs of perennial non-fish bearing streams and 990 acres of RHCAs along intermittent streams would be included in the landscape burning. Existing roads would aid in retaining riparian vegetation in some areas by providing a break in fuels so that the applied fire cannot back into the riparian area. Approximately 3.25 fewer miles of RHCAs would be included in underburn units under this alternative as compared to alternative 2.

### *Cumulative Effects*

#### Alternative 2

Some past activities, grazing, road construction in riparian areas, harvest, restoration of aspen stands, creating upland water sources, and fencing riparian areas have all likely affected stream temperatures. Past harvest activities removed some trees that provided shade within Riparian Habitat Conservation Areas. Since 1980, 528 acres have been harvested within RHCAs of fish bearing streams (36% of class I RHCAs) and 150 acres have been harvested within RHCAs of perennial non-fish bearing streams (70% of class III RHCAs). Road construction along or crossing creeks removed all riparian vegetation along the roadbed. In some cases this left long stretches of creek without shade. Grazing of riparian areas removed vegetation that was providing shade and also caused higher stream width to depth ratios through bank trampling. This created a larger surface area versus depth increasing the efficiency of solar radiation heating streams.

Other past activities have increased shade and contributed to lower stream temperatures. Non-commercial thinning and aspen stand restoration in Riparian Habitat Conservation Areas, after a brief reduction in shade, encouraged remaining trees to grow larger so that they provide more shade than the original stand. Fencing of three miles of Little Wall Creek and four miles of Bacon Creek in the Little Wall cattle allotment has allowed riparian vegetation to recover from past grazing impacts, providing more shade to the streams. In addition, the construction of 41 upland water sources for cattle outside of RHCAs has diverted cattle from streams reducing the impact to the riparian vegetation on unfenced stretches of stream.

The remaining unfenced portions of stream in the Little Wall cattle allotment continues to be impacted by grazing with a minimal reduction in riparian vegetation at these locations.

Future foreseeable activities proposed for these subwatersheds that would affect stream temperatures include aspen restoration, prescribed fire, and fencing of additional riparian areas on Little Wall Creek. In the short-term, conifer removal in aspen stands would reduce shade but aspen would quickly fill in the opening and eventually provide for more shade on these reaches in the future allowing movement toward attainment of riparian management objectives. Prescribed fire may burn into riparian areas and may remove some riparian vegetation that currently provides shade but this would recover and shade would be restored. Fencing an additional two miles of Little Wall Creek would allow more riparian vegetation to recover.

All activities that reduce stream shade could potentially increase stream water temperatures. Currently much of the past reduction in shade is recovering or would continue to recover in the future. Overall there would still be some roads that would contribute to a reduction in shade along some segments of streams. Grazing would still impact riparian vegetation along some stream channels, but since most of the shade is provided by vegetation the cattle do not eat little impact to stream temperatures should be seen. Activities proposed in this project could cumulatively decrease the amount of shade on affected stream reaches if prescribed fire should back into RHCAs and remove shade providing vegetation. This effect would be short term and most vegetation providing shade should recover within 3-5 years. Though shade may be reduced at isolated locations it would not likely be expansive enough to cause a measurable change in water temperatures.

### Alternative 3

Some past activities, grazing, road construction in riparian areas, harvest, restoration of aspen stands, creating upland water sources, and fencing riparian areas have all likely affected stream temperatures. Past harvest activities removed some trees that provided shade within Riparian Habitat Conservation Areas. Since 1980, 528 acres have been harvested within RHCAs of fish bearing streams (36% of class I RHCAs) and 150 acres have been harvested within RHCAs of perennial non-fish bearing streams (70% of class III RHCAs). Road construction along or crossing creeks removed all riparian vegetation along the roadbed. In some cases this left long stretches of creek without shade. Grazing of riparian areas removed vegetation that was providing shade and also caused higher stream width to depth ratios through bank trampling. This created a larger surface area versus depth increasing the efficiency of solar radiation heating up streams.

Other past activities have increased shade and contributed to lower stream temperatures. Non-commercial thinning and aspen stand restoration in Riparian Habitat Conservation Areas, after a brief reduction in shade, encouraged remaining trees to grow larger so that they provide more shade than the original stand. Fencing three miles of Little Wall Creek and four miles of Bacon Creek in the Little Wall cattle allotment has allowed riparian vegetation to recover from past grazing impacts, providing more shade to the streams. In addition, the construction of 41 upland water sources for cattle outside of RHCAs has diverted cattle from streams reducing the impact to the riparian vegetation on unfenced stretches of stream.

The remaining unfenced portions of stream in the Little Wall cattle allotment continues to be impacted by grazing, with a minimal reduction in riparian vegetation at these locations.

Future foreseeable activities proposed for these subwatersheds that would affect stream temperatures include aspen restoration, prescribed fire, and fencing of additional riparian areas on Little Wall Creek. In the short-term, conifer removal in aspen stands would reduce shade, but aspen would quickly fill in the opening and eventually provide for more shade on these reaches in the future. Prescribed fire may burn into riparian areas and may remove some riparian vegetation that currently provides shade but this would recover and shade would be restored. Fencing an additional two miles of Little Wall Creek would allow more riparian vegetation to recover.

All activities that reduce stream shade could potentially increase stream water temperatures. Currently much of the past reduction in shade is recovering or would continue to recover in the future. Overall there would still be some roads that would contribute to a reduction in shade along some segments of streams. Grazing would still impact riparian vegetation along some stream channels, but, since most of the shade is provided by vegetation the cattle do not eat, little impact to stream temperatures should be seen. Activities proposed in this project could cumulatively decrease the amount of shade on affected stream reaches if prescribed fire should back into RHCAs and remove shade providing vegetation. This effect would be short term and most vegetation providing shade should recover within 3-5 years. Though shade may be reduced at isolated locations it would not likely be expansive enough to cause a measurable change in water temperatures.

#### Alternative 4

Some past activities, grazing, road construction in riparian areas, harvest, restoration of aspen stands, creating upland water sources and fencing riparian areas have all likely affected stream temperatures. Past harvest activities removed some trees that provided shade within Riparian Habitat Conservation Areas. Since 1980, 528 acres have been harvested within RHCAs of fish bearing streams (36% of class I RHCAs) and 150 acres have been harvested within RHCAs of perennial non-fish bearing streams (70% of class III RHCAs). Road construction along or crossing creeks removed all riparian vegetation along the roadbed. In some cases this left long stretches of creek without shade. Grazing of riparian areas removed vegetation that was providing shade and also caused higher stream width to depth ratios through bank trampling. This created a larger surface area versus depth increasing the efficiency of solar radiation heating up streams.

Other past activities have increased shade and contributed to lower stream temperatures. Non-commercial thinning and aspen stand restoration in Riparian Habitat Conservation Areas, after a brief reduction in shade, encouraged remaining trees to grow larger so that they provide more shade than the original stand. Fencing of three miles of Little Wall Creek and four miles of Bacon Creek in the Little Wall cattle allotment has allowed riparian vegetation to recover from past grazing impacts, providing more shade to the streams. In addition, the construction of 41 upland water sources for cattle outside of RHCAs has diverted cattle from streams reducing the impact to the riparian vegetation on unfenced stretches of stream.

The remaining unfenced portions of stream in the Little Wall cattle allotment continues to be impacted by grazing with a minimal reduction in riparian vegetation at these locations.

Future foreseeable activities proposed for these subwatersheds that would affect stream temperatures include aspen restoration, prescribed fire, and additional fencing of two miles of Little Wall Creek. In the short-term, conifer removal in aspen stands would reduce shade but aspen would quickly fill in the opening and eventually provide for more shade on these reaches in the future. Prescribed fire may burn into riparian areas and may remove some riparian vegetation that currently provides shade but this would recover and shade would be restored. Fencing an additional two miles of Little Wall Creek would allow more riparian vegetation to recover.

All activities that reduce stream shade could potentially increase stream water temperatures. Currently much of the past reduction in shade is recovering or would continue to recover in the future. Overall there would still be some roads that would contribute to a reduction in shade along some segments of streams. Grazing would still impact riparian vegetation along some stream channels, but since most of the shade is provided by vegetation the cattle do not eat little impact to stream temperatures should be seen. Activities proposed in this project could cumulatively decrease the amount of shade on affected stream reaches if prescribed fire should back into RHCAs and remove shade providing vegetation. This effect would be short term and most vegetation providing shade should recover within 3-5 years. Though shade may be reduced at isolated locations it would not likely be expansive enough to cause a measurable change in water temperatures.

## Sediment/Substrate

### Current Condition

During surveys in 1992 and 1993 substrate embeddedness within stream reaches was estimated as being above or below 35% (Table A-3). These estimates were averaged over the entire reach.

Little Wall Creek was re-surveyed in 2000. Embeddedness was not recorded during this survey though percent fines were estimated visually. There was an average of 6 percent fines throughout the three reaches.

Table A-3. Average embeddedness in stream reaches within the analysis area (1992-1993).

| Stream | Reach | Embeddedness |
|---|---|---|
| Little Wall | 1-1993 | <35% |
| | 2-1993 | <35% |
| | 3-1993 | <35% |
| Bacon | 1 | <35% |
| | 2 | <35% |
| Three Trough | 1 | >35% |
| Lovlett | 1 | <35% |
| Lovlett | 2 | ND |
| Squaw | 1 | <35% |

High levels of sediment loading (>35% embeddedness or >20% fines[4]) within the stream can lead to reduced quality of spawning substrate, the smothering of incubating fish eggs and can indirectly affect eggs and fry by reducing water flow through stream gravels leading to high levels of mortality (Hartman et al. 1997). The data in Table A-5 indicates that only Three Trough Creek was embedded.

### Direct and Indirect Effects

#### Alternative 1

Because fuels would remain untreated and additional fuels would accumulate due to bark beetle and tussock moth outbreaks under this alternative, there could be indirect increases in sediment if a large wildfire were to occur within the analysis area due to transport of fine ash, a loss of soil cover, and increased water run-off rates.

#### Alternative 2

Alternatives were compared using information about the amount of soil exposure (Table A-4), which is

[4] Fines are defined as particles <2mm in diameter.

indirectly linked with sediment deposition in streams.  This alternative would involve some level of soil exposure on 1,483 acres.

Table A-4.  Potential soil exposure associated with the Action Alternatives.

| | Alt 2 | Alt 3 | Alt 4 |
|---|---|---|---|
| Harvest & Fuels Treatment acres* | 339 | 253 | 303 |
| Additional Non-commercial thinning & Fuels Treatment acres | 70 | 68 | 70 |
| Acres of tractor fire line | 5 | 7 | 6 |
| Landscape burning* | 1020 | 862 | 935 |
| Acres of road reopened plus temporary roads | 48.5 | 43.7 | 48.5 |
| Total Acres of potential soil exposure | 1483 | 1234 | 1363 |
| Aspen acres | 35 | 35 | 35 |

* Potential soil exposure is based on the assumption that up to 10% of treated acres would be exposed to machine operation and up to 10% soil exposure may occur with prescribed burns and fuels treatment.

Up to four miles of temporary road would be constructed under this alternative.  The majority of these temporary roads would be outside RHCAs, however one would cross a class four stream.  This temporary road would require blading and would likely increase the possibility of sediment transport to this class 4 stream.  The temporary road would cross the creek along the contour where the ground is fairly flat to minimize erosion and sediment transport to the creek.  Use of this road would only be allowed when the road is dry to prevent excess amounts of sediment from entering the creek.

Reopening currently closed roads would pose some risk to increased sediment runoff.  About 16 miles of roads to be reopened are native surface roads, which could need blading to improve drivability.  In addition, a number of these native surface roads include thirteen stream crossings and/or low water fords.  Seven of these crossings are on class 4 streams and six are on ephemeral draws.  Blading these roads would loosen soil, which could potentially increase the amount of sediment, particularly at the stream crossings.  Blading would be limited in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams.  Also, mitigation would require installation of cross-ditches to spread water wherever needed, as well as require that use of low water fords be avoided unless the channel is dry.

Seven miles of road would need to be reconstructed to facilitate hauling.  Two of the reconstructed roads (2120-140 and 2202-071) would involve the installation of a culvert at two stream crossings.  Installation of these two culverts would result in a short-term increase in loose sediment entering two class 4 tributaries, one to Bacon Creek and one to Little Wall Creek.  The locations of these crossings are 0.5 to 1 mile from fish bearing waters.  While there is the potential that some sediment with reach fish habitat the majority of the sediment entering the class 4 channels during culvert placement would settle out before reaching fish habitat.  Over the long term however, sediment entering these streams would be reduced as vehicles would no longer be fording these creeks.

Harvest and mechanical fuels treatment on 3,394 acres could result in soil exposure on 339 acres due to the use of ground-based equipment and the burning of harvest debris.  Landscape burning on 10,196 acres would also result in soil exposure.  Up to 10 % of the burned area may have exposed soil following burning (1,020 acres).  Landscape burning could result in up to 73 acres of exposed soil in RHCAs of fish bearing streams, 5 acres on perennial non-fish bearing streams and 106 acres on intermittent streams.  The above conservative estimates are based on maximums allowed under the Forest Plan.  Monitoring from previous projects has indicated that likely soil exposure would be less than 3 percent in most cases.  Up to 5.5 miles of tractor line would be constructed around burn units.  Tractor line can be up to 8 feet wide resulting in 6 acres of exposed soil.  Handlines would be used in RHCAs and where stream crossings are involved to minimize soil exposure near streams, wet lines would also be used when ever possible.

Mitigation measures limit operation of ground-based equipment to slopes that average 35 percent or less, require pre-approval of skid trails, forwarder trails, and other log transportation routes by the Forest Service to meet the Best Management Practices, confine operation of equipment within ephemeral draws to designated crossings containing a layer of debris, and suspend use of ground-based equipment when conditions would otherwise result in excessive soil displacement.  These mitigations would minimize soil disturbance and keep most soil disturbance far enough away from streams so potential sediment from these sources would only minimally impact streams.  In general, filter strips on the order of 200 to 300 feet in width are effective in controlling sediment that is not channelized (Belt et al. 1992).  The only harvest related activities that would occur within RHCAs are skidding or forwarding logs over two class four channels from unit 66 and thinning in unit 18.  These two class four channels are approximately one half mile above fish bearing waters in the headwaters of Bacon Creek.  Skidding across these two channels would likely lead to erosion and bank instability and would increase sediment input into these stream channels.  This activity would only occur when the channel is dry to minimize the amount of disturbance.  Vegetation may recover the next fall along the skid trail or forwarder trail but some sediment would be transported downstream and may reach fish bearing waters when flow returns to these two creeks.  The amount of sediment transported would not likely cause changes to any fish habitat parameters.

Landscape burning could mobilize sediment if soil is exposed by large debris piles that burn hot or if fire moves into the floodplain of a stream channel.  However, no ignition would take place within Riparian Habitat Conservation Areas, so fire would not likely burn into the floodplain and the likelihood of sediment production associated with this project would be very low.  The duration for this potential effect would be brief (<1 year).  Burn intensities would be expected to be low and localized, and re-sprouting of vegetation could occur within two weeks of soil exposure (Agee 1993).

#### Alternative 3

This alternative would involve some level of soil exposure on approximately 1,234 acres (Table A-4).

The effects of roads: temporary roads, closed roads reopened, stream crossings, and road reconstruction are described in alternative 2.  Under alternative 3 the miles of roads have been reduced. 2.4 miles of temporary roads would be constructed outside of RHCAs so no sediment from these roads is expected to reach streams.  About 15 miles of roads to be reopened are native surface roads.  In addition, a number of these native surface roads include thirteen stream crossings and/or low water fords.  Seven of these crossings are on class 4 streams and six are on ephemeral draws.  Seven miles of road would be reconstructed and the installation of the same two culverts as alternative 2 would replace the current low water fords.  All mitigation described in alternative 2 would still apply to alternative 3.

Harvest and mechanical fuels treatment on 2,528 acres could result in soil exposure on 253 acres due to the use of ground-based equipment and the burning of harvest debris. Landscape burning on 8,617 acres would also result in soil exposure. Up to 10 % of the burned area may have exposed soil following burning (862 acres). Landscape burning could result in up to 62 acres of exposed soil in RHCAs of fish bearing streams, 5 acres on perennial non-fish bearing streams and 95 acres on intermittent streams. Up to 7 miles of tractor line would be constructed around burn units these lines can be up to 8 feet wide resulting in 7 acres of soil disturbance. Handlines would be used in RHCAs and where stream crossings are involved to minimize soil exposure near streams.

#### Alternative 4

This alternative would involve some level of soil exposure on 1,363 acres (Table A-4).

The only change in roads between this alternative and alternative 2 is miles of temporary roads. Up to 3.8 miles of temporary roads may be constructed under this alternative. The majority of these temporary roads would be outside RHCAs, however one would cross a class four stream (unit 74). This temporary road would require blading and would likely increase the possibility of sediment transport to this class 4 stream. The temporary road would cross the creek along the contour where the ground is fairly flat to minimize erosion and sediment transport to the creek. Use of this road would only be allowed when the road is dry to prevent excess amounts of sediment from entering the creek.

Harvest and mechanical fuels treatment on 3,034 acres could result in soil exposure on 303 acres due to the use of ground-based equipment and the burning of harvest debris. Landscape burning on 9,347 acres would also result in soil exposure. Up to 10 % of the burned area may have exposed soil following burning (935 acres). Landscape burning could result in up to 66 acres of exposed soil in RHCAs of fish bearing streams, 5 acres on perennial non-fish bearing streams and 99 acres on intermittent streams. Up to 6 miles of tractor line would be constructed around burn units. Tractor lines can be up to 8 feet wide and would result in 6 acres of soil disturbance. Handlines would be used in RHCAs and where stream crossings are involved to minimize soil exposure near streams.

Mitigation measures would be the same as described under alternative 2.

### *Cumulative Effects*

#### Alternative 2

The Alder/Upper Skookum subwatershed could have experienced an increase in sediment load due to past management activities including road construction, timber harvest, prescribed fire, grazing, and failure of instream fish structures. Road construction increased the drainage area with several stream crossings that allow sediment to be transported directly to the streams from roads. Grazing in the past caused bank destabilization, which contributed sediment to streams. Several instream structures were constructed in Little Wall Creek. Many of these structures are failing and are causing bank erosion and also contributing sediment to streams.

Past activities that have reduced sediment input into streams include aspen stand restoration, which tends to increase bank stability within these stands. Fencing of RHCAs in cattle allotments has allowed riparian vegetation to recover providing more structure for increased bank stability and less trampling of the bank. In addition the construction of upland water sources for cattle has diverted cattle from streams reducing the impact to stream banks on unfenced stretches of stream.

Present activities that are contributing to an increase in sediment transport to streams include grazing and roads. There are still some unfenced areas of stream in cattle allotments that are impacted by grazing. Continued grazing is still causing bank destabilization at isolated locations. There are still 104 miles of road within the analysis area of which 33 miles are within RHCAs, 15.7 miles within RHCAs of fish bearing streams. There are also approximately 183 stream crossings within this subwatershed, some of which may be contributing sediment into streams.

Future foreseeable activities are proposed for this subwatershed that would affect sediment load including prescribed fire, grazing, and riparian fencing on Little Wall Creek. Fencing two additional miles along Little Wall Creek would further reduce the impact cattle have on stream banks allowing these areas to recover eventually reducing the amount of sediment entering the creeks associated with bank destabilization.

The activities contributing sediment to streams, if left as is, would continue to impact aquatic habitats. Actions were taken in an attempt to reduce the amount of sediment into streams in the past by obliterating roads and fencing streams. Today only grazing on some sections of streams and existing roads are still contributing sediment to streams. Future riparian fencing would help to further reduce this sediment input. The current project may cumulatively contribute to sediment mobilization, and may cumulatively add to the amount of sediment in streams. Streams most at risk are class 4 channels where current activities would take place.

#### Alternative 3

The Alder/Upper Skookum subwatershed could have experienced an increase in sediment load due to past management activities including road construction, timber harvest, prescribed fire, grazing, and failure of instream fish structures. Road construction increased the drainage area with several stream crossings that allow sediment to be transported directly to the streams from roads. Grazing in the past caused bank destabilization, which contributed sediment to streams. Several instream structures were constructed in Little Wall Creek. Many of these structures are failing and are causing bank erosion and also contributing sediment to streams.

Past activities that have reduced sediment input into streams include aspen stand restoration, which tends to increase bank stability within these stands. Fencing of RHCAs along three miles of Little Wall Creek and four miles along Bacon Creek has allowed riparian vegetation to recover providing more structure for increased bank stability and less trampling of the bank. In addition the construction of 41 upland water sources for cattle has diverted cattle from streams reducing the impact to stream banks on unfenced stretches of stream.

Present activities that are contributing to an increase in sediment transport to streams include grazing and roads. There are still some unfenced areas of stream in cattle allotments that are impacted by grazing. Continued grazing is still causing bank destabilization at isolated locations. There are still 104 miles of road within the analysis area of which 33 miles are within RHCAs, 15.7 miles within RHCAs of fish bearing streams. There are also approximately 183 stream crossings within this subwatershed, some of which may be contributing sediment into streams.

Future foreseeable activities are proposed for this subwatershed that would affect sediment load including prescribed fire, grazing, and riparian fencing on Little Wall Creek. Fencing of part of the riparian area along flowing water in Little Wall Creek would further reduce the impact cattle have on stream banks allowing these areas to recover eventually reducing the amount of sediment entering the creeks associated with bank destabilization.

The activities contributing sediment to streams, if left as is, would continue to impact aquatic habitats. Actions were taken in an attempt to reduce the amount of sediment into streams in the past by obliterating roads and fencing streams. Today only grazing on some sections of streams and existing roads are still contributing sediment to streams. Future riparian fencing would help to further reduce this sediment input. The current project may cumulatively contribute to sediment mobilization, and may cumulatively add to the amount of sediment in streams. Streams most at risk are class 4 channels where closed roads would be reopened and blading of these roads would occur near stream crossings. This alternative would not allow construction of temporary roads within RHCAs so less sediment would be transported to creeks.

#### Alternative 4

The Alder/Upper Skookum subwatershed could have experienced an increase in sediment load due to past management activities including road construction, timber harvest, prescribed fire, grazing, and failure of instream fish structures. Road construction increased the drainage area with several stream crossings that allow sediment to be transported directly to the streams from roads. Grazing in the past caused bank destabilization, which contributed sediment to streams. Several instream structures were constructed in Little Wall Creek. Many of these structures are failing and are causing bank erosion and also contributing sediment to streams.

Past activities that have reduced sediment input into streams include aspen stand restoration, which tends to increase bank stability within these stands. Fencing of RHCAs in cattle allotments has allowed riparian vegetation to recover providing more structure for increased bank stability and less trampling of the bank. Three miles of Little Wall Creek and four miles of Bacon Creek have been fenced. In addition the construction of 41 upland water sources for cattle has diverted cattle from streams reducing the impact to stream banks on unfenced stretches of stream.

Present activities that are contributing to an increase in sediment transport to streams include grazing and roads. There are still some unfenced areas of stream in cattle allotments that are impacted by grazing. Continued grazing is still causing bank destabilization at isolated locations. There are still 104 miles of road within the analysis area of which 33 miles are within RHCAs, 15.7 miles within RHCAs of fish bearing streams. There are also approximately 183 stream crossings within this subwatershed, some of which may be contributing sediment into streams.

Future foreseeable activities are proposed for this subwatershed that would affect sediment load including prescribed fire, grazing, and riparian fencing on Little Wall Creek. Fencing of part of the riparian area along two miles of Little Wall Creek will further reduce the impact cattle have on stream banks allowing these areas to recover eventually reducing the amount of sediment entering the creeks associated with bank destabilization.

The activities contributing sediment to streams, if left as is, would continue to impact aquatic habitats. Actions were taken in an attempt to reduce the amount of sediment into streams in the past by obliterating roads and fencing streams. Today only grazing on some sections of streams and existing roads are still contributing sediment to streams. Future riparian fencing would help to further reduce this sediment input. The current project may cumulatively contribute to sediment mobilization, and may cumulatively add to the amount of sediment in streams. Streams most at risk are class 4 channels where closed roads would be reopened and blading of these roads would occur near stream crossings. This alternative would not allow construction of temporary roads within RHCAs so less sediment would be transported to creeks.

# Pool Frequency and Quality

## Current Condition

Pool frequency data was collected during stream surveys within the analysis area and is displayed in Table A-6 below. These surveys classified channel habitat units into riffles, pools, and glides. Conversion of this data into the SMART database in 2000 required the reclassification of all glides as either pools or riffles. The data presented here reflects data that has gone through this conversion.

Pool densities in this table are compared to the median pool density of unmanaged streams in the Blue Mountain province. The residual pool depths displayed in Table A-6 indicate that streams in the analysis area have habitat available for fish during the low flow period. The proportion of pools having at least one piece of large woody debris is unknown.

Table A-5. Pool frequency, average wetted width, and residual pool depths for stream reaches within the analysis area.

| Stream | Reach | Pools/Mile | Wetted Width of Riffles (ft) | ICBEMP Standard | Residual Depth |
|---|---|---|---|---|---|
| Little Wall | 1-1993 | 7.8 | 9.9 | 14.9 | 1.4 |
| | 2-1993 | 26.3 | 9.6 | 15.4 | 2.5 |
| | 3-1993 | 9.7 | 5.8 | 25.5 | 1.7 |
| | 1-2000 | 28.2 | 9.76 | 15.1 | 1.28 |
| | 2-2000 | 30.7 | 4.90 | 39 | 1.86 |
| | 3-2000 | 22.6 | 4.32 | 39 | 1.03 |
| Bacon | 1 | 16.0 | 6.1 | 24.2 | 1.5 |
| | 2 | 6.9 | 4.6 | 39 | 1.4 |
| Three Trough | 1 | 4.5 | 4.6 | 39 | 0.9 |
| Squaw | 1 | 4.4 | 2.8 | 39 | 1.5 |
| Lovlett | 1 | 11.3 | 3.2 | 39 | 1.5 |
| Lovlett | 2 | 2.6 | 4.3 | 39 | 1.5 |

Pool frequency is an indication of habitat quantity where pool depth can be good indicator of habitat quality. The only reaches to have a sufficient number of pools to meet standards were reach 2 of Little Wall in 1993 and reach 1 in Little Wall in 2000; all others were below standards. Since the number and quality of pools can determine the habitat availability for fish species; this data indicates limited habitat for resident fish. Little Wall Creek between the Forest boundary and Squaw Creek (reach 2) has 78 man-made structures (included in table A-6). Some of these structures are still functioning and are providing deep, slow-water pool habitat and refugia where fish are able to survive summer low water and high water temperatures.

## Direct and Indirect Effects

### Alternative 1

As discussed in the Sediment/Substrate section, the risk of a large severe wildfire is greater due to untreated fuel loads and sediment deposition in streams could increase due to a loss of ground cover and increased water run-off rates. If an excessive amount of sediment were transported to streams, the sediment could settle in pools and there could be a loss of pool frequency or at least a reduction in pool quality.

### Alternative 2

One of the activities that could affect pool frequency would be skidding or forwarding logs across class four channels. Skidding trees across stream channels can create depressions in the streambed creating pools. This activity would only occur on class 4 channels so would not affect fish habitat.

Hazard trees would be felled along haul routes and where these trees occur near streams they would be left where they fall. Cutting of hazard trees may increase large wood in isolated locations. The increase in large wood could indirectly increase pool formation in streams where hazard trees fall in the stream channel.

### Alternative 3

Hazard trees would have the same effect on pool frequency and quality as described under alternative 2. No other activity under this alternative would affect pools.

### Alternative 4

Hazard trees would have the same effect on pool frequency and quality as described under alternative 2. No other activity under this alternative would affect pools.

## Cumulative Effects

### Alternative 2

Past activities that have affected pool frequency include commercial harvest in RHCAs, road construction, grazing and installation of instream structures. Commercial harvest in the past in RHCAs led to an overall reduction in potential large wood that could fall into creeks. Because large wood is one of the main contributing factors to pool formation the loss of this potential large wood also led to the loss of potential pools in these creeks. Road construction along creeks or crossing creeks can also lead to a loss of potential large wood, which leads indirectly to a loss in pool formation. Grazing of RHCAs has led to bank destabilization which can in turn input large amounts of sediment into streams causing pools to fill and reducing overall pool quality. Other activities have attempted to increase the number of pools in streams including the installation of instream structures. While these did increase the number of pools per mile over the short term many of these structures have failed and are no longer functioning as pools. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that would become large wood in the future. This activity increased the likelihood of natural pool formation by increasing potential large wood along streams. Grazing is the only present activity that could impact pool quality. There are still a few areas along perennial water that can be accessed by cattle. Bank destabilization and sediment input can still occur leading to a reduction in pool quality.

Future activities that can impact pool and pool quality include riparian fencing and fuels treatments.

Riparian fencing of an additional two miles of Little Wall Creek would reduce the amount of bank damage leading to sedimentation in the creek. This activity should reduce the degradation of pool quality in this stream. Fuels treatments in the analysis area in the future would function much the same as non-commercial thinning as it would generally remove the understory allowing the remaining trees to grow larger increasing the potential large wood and increasing the chance of natural pool formation.

#### Alternative 3

Past activities that have affected pool frequency include commercial harvest in RHCAs, road construction, grazing and installation of instream structures. Commercial harvest in the past in RHCAs lead to an overall reduction in potential large wood that could fall into creeks. Because large wood is one of the main contributing factors to pool formation the loss of this potential large wood also led to the loss of potential pools in these creeks. Road construction along creeks or crossing creeks can also lead to a loss of potential large wood, which leads indirectly to a loss in pool formation. Grazing of RHCAs has led to bank destabilization which can in turn input large amounts of sediment into streams causing pools to fill and reducing overall pool quality. Other activities have attempted to increase the number of pools in streams including the installation of instream structures. While these did increase the number of pools per mile over the short term many of these structures have failed and are no longer functioning as pools. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that would become large wood in the future. This activity increased the likelihood of natural pool formation by increasing potential large wood along streams. Grazing is the only present activity that could impact pool quality. There are still a few areas along perennial water that can be accessed by cattle. Bank destabilization and sediment input can still occur leading to a reduction in pool quality.

Future activities that can impact pool and pool quality include riparian fencing and fuels treatments. Riparian fencing of an additional two miles of Little Wall Creek would reduce the amount of bank damage leading to sedimentation in the creek. This activity should reduce the degradation of pool quality in this stream. Fuels treatments in the analysis area in the future would function much the same as non-commercial thinning as it would generally remove the understory allowing the remaining trees to grow larger increasing the potential large wood and increasing the chance of natural pool formation.

#### Alternative 4

Past activities that have affected pool frequency include commercial harvest in RHCAs, road construction, grazing and installation of instream structures. Commercial harvest in the past in RHCAs lead to an overall reduction in potential large wood that could fall into creeks. Because large wood is one of the main contributing factors to pool formation the loss of this potential large wood also led to the loss of potential pools in these creeks. Road construction along creeks or crossing creeks can also lead to a loss of potential large wood, which leads indirectly to a loss in pool formation. Grazing of RHCAs has led to bank destabilization which can in turn input large amounts of sediment into streams causing pools to fill and reducing overall pool quality. Other activities have attempted to increase the number of pools in streams including the installation of instream structures. While these did increase the number of pools per mile over the short term many of these structures have failed and are no longer functioning as pools. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that would become large wood in the future. This activity increased the likelihood of natural pool formation by increasing potential large wood along streams. Grazing is the only present activity that could impact pool quality. There are still a few areas along perennial water that can be accessed by cattle. Bank destabilization and sediment input can still occur leading to a reduction in pool quality.

Future activities that can impact pool and pool quality include riparian fencing and fuels treatments. Riparian fencing of an additional two miles of Little Wall Creek would reduce the amount of bank damage leading to sedimentation in the creek. This activity should reduce the degradation of pool quality in this stream. Fuels treatments in the analysis area in the future would function much the same as non-commercial thinning as it would generally remove the understory allowing the remaining trees to grow larger increasing the potential large wood and increasing the chance of natural pool formation.

## Large Woody Debris

### Current Condition

Large woody debris data, collected during stream surveys, is summarized in Table A-6 below.

Table A-6. Large woody debris (large and small size class) within the analysis area.

| Stream | Reach | LWD/Mile |
|---|---|---|
| Little Wall | 1-1993 | 72.1* |
| | 2-1993 | 38* |
| | 3-1993 | 45.1* |
| | 1-2000 | 14.9 |
| | 2-2000 | 21.6 |
| | 3-2000 | 7.8 |
| Bacon | 1 | 48.8* |
| | 2 | 22* |
| Squaw | 1 | 33* |
| Lovlett | 1 | 42.2* |
| Lovlett | 2 | 13.3* |
| Three Trough | 1 | 32.1* |

***Prior to 1996 any trees live or dead that were leaning towards the creek or suspended over the creek were also counted as large wood. This would account for the inflated values of large wood per mile in the 1992 and 1993 stream surveys.***

Of the surveyed streams, only reach 1 and 3 on Little Wall Creek in 2000 and reach 2 on Lovlett Creek did not exceed PacFish standards[5] for large woody debris (20 pieces per mile). The lack of wood suggests that channel complexity and habitat quality is lower in the streams that do not meet the standard. This, in turn, limits the amount of habitat available for fish and, consequently, population sizes. The lack of large wood can indirectly lead to a reduced food supply, since large wood serves as a foundation for macro invertebrates, the primary food source for fish.

[5] The component of large wood was not represented in ICBEMP summary values.

## Direct and Indirect Effects

### Alternative 1

Because fuels would remain untreated under this alternative, should a large wildfire occur there could be direct effects to the amount of large wood along streams. In addition, since thinning would not occur in bark beetle and tussock moth infected areas additional trees may die potentially leading to a short term increase in large wood.

### Alternative 2

The majority of the activities would occur outside of Riparian Habitat Conservation Areas and so would not impact large wood. Only cutting of hazard trees, skidding or forwarding of wood across two class four tributaries from unit 66, removal of conifer trees from aspen unit 18, and prescribed burning would occur within RHCAs. Hazard trees would be felled along haul routes and where these trees occur near streams they would be left where they fall. Cutting of hazard trees may increase large wood in isolated locations. Skidding or forwarding crossings would be chosen where no trees would need to be removed so there would be no change in the amount of large wood or future recruitment of large wood to streams. Some potential large wood could be removed from the aspen stand in unit 18. This would allow restoration of this stand increasing future large wood. Landscape burning though not lighted in RHCAs would be allowed to back down into RHCAs. Prescribed fire has the potential to kill larger trees and create more large wood and also may remove smaller trees near streams allowing remaining large trees to grow quicker increasing the amount of potential large wood. No other activities would affect the amount of large wood in streams.

### Alternative 3

The majority of the activities would occur outside of Riparian Habitat Conservation Areas and so would not impact large wood. Only cutting of hazard trees, removal of conifer trees from aspen unit 18, and prescribed burning would occur within RHCAs. The affects would be the same for each of these activities as described under alternative 2. No other activities would affect the amount of large wood in streams.

### Alternative 4

The majority of the activities would occur outside of Riparian Habitat Conservation Areas and so would not impact large wood. Activities that may affect large wood are the same as under alternative 3. No other activities would affect the amount of large wood in streams.

## Cumulative Effects

### Alternative 2

The contribution to cumulative effects of activities under all action alternatives may be a short-term (5-10 years) loss of potential large wood through loss of small trees that could lead to a delay in additional pool formation.

Past activities that have affected large wood include commercial harvest in RHCAs and road construction. Commercial harvest in the past in RHCAs lead to and overall reduction in potential large wood that can fall into creeks. Road construction along creeks also lead to a loss of potential large wood all along the roadbed located within RHCAs. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that would become large wood in the future.

Future activities that can impact large wood include hazard tree removal and fuels treatments. Hazard tree falling would likely increase large wood over the short term. Fuels treatments in the analysis area in the future would function much the same as non-commercial thinning as it would generally remove the understory allowing the remaining trees to grow larger increasing the potential large wood.

The contribution to cumulative effects of activities under all action alternatives would be a short-term loss of potential large wood during burning; however the remaining trees would grow quicker and larger increasing potential large wood over the long term. In addition, falling of hazard trees would likely increase large wood over the short-term.

#### Alternative 3

The contribution to cumulative effects of activities under all action alternatives may be a short-term (5-10 years) loss of potential large wood through loss of small trees that could lead to a delay in additional pool formation.

Past activities that have affected large wood include commercial harvest in RHCAs and road construction. Commercial harvest in the past in RHCAs lead to and overall reduction in potential large wood that can fall into creeks. Road construction along creeks also lead to a loss of potential large wood all along the roadbed located within RHCAs. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that would become large wood in the future.

Future activities that can impact large wood include hazard tree removal and fuels treatments. Hazard tree falling would likely increase large wood over the short term. Fuels treatments in the analysis area in the future would function much the same as non-commercial thinning as it would generally remove the understory allowing the remaining trees to grow larger increasing the potential large wood.

The contribution to cumulative effects of activities under all action alternatives would be a short-term loss of potential large wood during burning however the remaining trees would grow quicker and larger increasing potential large wood over the long term. In addition, falling of hazard trees would likely increase large wood over the short-term.

#### Alternative 4

Past activities that have affected pool frequency include commercial harvest in RHCAs, road construction, grazing and installation of instream structures. Commercial harvest in the past in RHCAs lead to an overall reduction in potential large wood that could fall into creeks. Because large wood is one of the main contributing factors to pool formation the loss of this potential large wood also led to the loss of potential pools in these creeks. Road construction along creeks or crossing creeks can also lead to a loss of potential large wood, which leads indirectly to a loss in pool formation. Grazing of RHCAs has led to bank destabilization which can in turn input large amounts of sediment into streams causing pools to fill and reducing overall pool quality. Other activities have attempted to increase the number of pools in streams including the installation of instream structures. While these did increase the number of pools per mile over the short term many of these structures have failed and are no longer functioning as pools. Non-commercial thinning in RHCAs in the past has allowed for the growth of larger trees that would become large wood in the future. This activity increased the likelihood of natural pool formation by increasing potential large wood along streams. Grazing is the only present activity that could impact pool quality. There are still a few areas along perennial water that can be accessed by cattle. Bank destabilization and sediment input can still occur leading to a reduction in pool quality.

Future activities that can impact pool and pool quality include riparian fencing, and fuels treatments. Riparian fencing of an additional two miles of Little Wall Creek would reduce the amount of bank damage leading to sedimentation in the creek. This activity should reduce the degradation of pool quality in this stream. Fuels treatments in the analysis area in the future would function much the same as non-commercial thinning as it would generally remove the understory allowing the remaining trees to grow larger increasing the potential large wood and increasing the chance of natural pool formation.

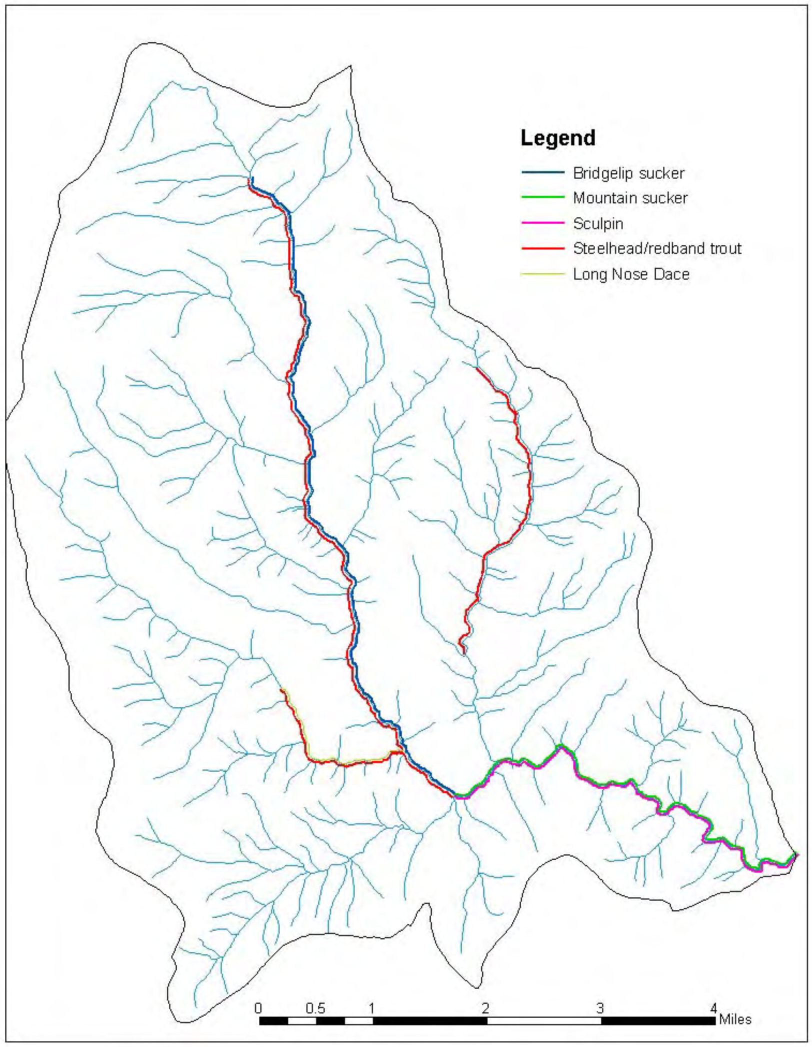
The contribution to cumulative effects of activities under all action alternatives may be a short-term (5-10 years) loss of potential large wood through loss of small trees that could lead to a delay in additional pool formation.

## Threatened, Endangered, Sensitive Species and Management Indicator Species

### *Current Condition*

The John Day River is the largest Columbia River tributary with no major dams or reservoirs acting as passage barriers for migrating salmonids (though dams do occur downstream on the Columbia River). This is part of the reason it supports the largest remaining wild stock of spring Chinook salmon in the Columbia River Basin. The North Fork John Day and its tributaries account for about 70 percent of the salmon production in the John Day Basin. The John Day River Basin once supported substantial runs of both spring and fall Chinook salmon and summer steelhead.

Figure 1-A. Fish distribution for the Sunflower Bacon Vegetation Management analysis area.




Streams within the analysis area host two species of salmonids—steelhead and redband trout. Both of these species have been identified by the Interior Columbia Basin Ecosystem Management Project (ICBEMP) as key salmonids—important indicators of aquatic integrity. These two species have also been identified as management indicator species in the Umatilla National Forest Land and Resource Management Plan (1990).

The Forest Service's Pacific Northwest Region has listed Mid-Columbia steelhead and redband trout as sensitive aquatic species present in the analysis area. Another sensitive species that may be in the analysis area is the California floater (a fresh water mussel).

In March 1999, the National Marine Fisheries Service listed mid-Columbia steelhead as Threatened under Endangered Species Act authority (Federal Register 1999). Federally designated fish Species of Concern present in or near the analysis area include interior redband trout.

#### Mid-Columbia Steelhead (MIS) and Designated Critical Habitat

Steelhead may be found in Little Wall Creek, Bacon Creek and lower Three Trough Creek. Spawning by steelhead is known to occur in Little Wall and Bacon creeks. Lower Three Trough Creek, Little Wall Creek below confluence with One Trough Canyon and the lower half of Bacon Creek have all been designated as critical habitat for steelhead.

#### Interior Redband Trout (MIS)

Redband trout potentially spawn and rear in all fish bearing streams within the analysis area.

#### Other Species

The Pacific lamprey, California floater, Columbia Dusky snail, and margined sculpin will not be discussed in the effects portion of this document because these species are not expected to be present in the analysis area. Further discussion and rational may be found in the Aquatic Specialist Report located in the project file.

### *Direct and Indirect Effects*

#### Alternative 1

This alternative would not directly affect fish species (redband trout and steelhead) in the analysis area. However, the potential for a large, high severity fire would continue to increase. A large wildfire could potentially remove all fish from a burned over stream (as documented in the 1996 Bull, Tower, and Summit fires, 2000 Meadow Fire, and 2003 Bull Springs Fire which occurred locally on the Umatilla National Forest in similar stand conditions). Fish that remain would have to survive in a habitat degraded by loss of shade, increased sediment from ash and unprotected soil, loss of future large wood, etc. In such an event, spawning and rearing success would be reduced.

#### Alternative 2

The majority of activities would occur outside of Riparian Habitat Conservation Areas, there would be little impact to aquatic habitat and the fish populations these habitats support. The analysis of aquatic habitat discussed above indicated that large wood may increase and pools may increase dependant on where hazard trees fall but effects to fish are not likely. In addition, analysis also indicated that sediment is likely to affect fish populations. Sediment could result from the use of heavy machines, blading and use of currently closed roads, construction of a temporary road across a class four channel and burning of activity-related debris and landscape burning. However, analysis also concluded that mitigation would minimize soil disturbance, that activities would occur away from most streams, and intact vegetation between activities and the streams would capture most mobilized sediment. Of biggest concern was the blading of currently closed roads, because blading would remove existing soil cover, roads tend to channelize water, and some of the roads to be bladed cross streams (13 crossings), so sediment could eventually find its way to stream channels. In addition, two culverts would be installed at two stream crossings (2120-140 and 2202-071). Placement of these culverts would cause a short-term increase in sediment entering these streams during installation but would lead to a long-term decrease in sediment with the reduction in the number of low water fords. Both of these culverts would be placed in class 4 non-fish bearing streams. Increases in fine sediments in large amounts could decrease reproductive success of fish by filling interstitial spaces between spawning gravel, so a determination was made that this increased sediment “May effect, but not likely to adversely affect” mid-Columbia steelhead and "May Impact" native redband trout. Such impacts to steelhead and redband trout populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams and restricting use of low water fords and culvert installation to times when the channel is dry. Very little of this sediment is expected to reach areas occupied by Mid-Columbia Steelhead.

#### Alternative 3

The majority of activities would occur outside of Riparian Habitat Conservation Areas, there would be little impact to aquatic habitat and the fish populations these habitats support. The analysis of aquatic habitat discussed above indicated that large wood may increase and pools may increase dependant on where hazard trees fall but effects to fish are not likely. In addition, analysis also indicated that sediment is likely to affect fish populations. Sediment could result from the use of heavy machines, blading and use of currently closed roads, and burning of activity-related debris and landscape burning. However, analysis also concluded that mitigation would minimize soil disturbance, that activities would occur away from most streams, and intact vegetation between activities and the streams would capture most mobilized sediment. Of biggest concern was the blading of currently closed roads, because blading would remove existing soil cover, roads tend to channelize water, and some of the roads to be bladed cross streams (13 crossings), so sediment could eventually find its way to stream channels. In addition, two culverts would be installed at two stream crossings (2120-140 and 2202-071). Placement of these culverts would cause a short-term increase in sediment entering these streams during installation but would lead to a long-term decrease in sediment with the reduction in the number of low water fords. Both of these culverts would be placed in class 4 non-fish bearing streams. Increases in fine sediments in large amounts could decrease reproductive success of fish by filling interstitial spaces between spawning gravel, so a determination was made that this increased sediment "May effect, but not likely to adversely affect" mid-Columbia steelhead and "May Impact" native redband trout. Such impacts to steelhead and redband trout populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams and restricting use of low water fords and culvert installation to times when the channel is dry. Very little of this sediment is expected to reach areas occupied by Mid-Columbia Steelhead.

#### Alternative 4

The majority of activities would occur outside of Riparian Habitat Conservation Areas, there would be little impact to aquatic habitat and the fish populations these habitats support. The analysis of aquatic habitat discussed above indicated that large wood may increase and pools may increase dependant on where hazard trees fall but effects to fish are not likely. In addition, analysis also indicated that sediment is likely to affect fish populations. Sediment could result from the use of heavy machines, blading and use of currently closed roads, construction of a temporary road across a class four stream channel, and burning of activity-related debris and landscape burning. However, analysis also concluded that mitigation would minimize soil disturbance, that activities would occur away from most streams, and intact vegetation between activities and the streams would capture most mobilized sediment. Of biggest concern was the blading of currently closed roads, because blading would remove existing soil cover, roads tend to channelize water, and some of the roads to be bladed cross streams (13 crossings), so sediment could eventually find its way to stream channels. In addition, two culverts would be installed at two stream crossings (2120-140 and 2202-071). Placement of these culverts would cause a short-term increase in sediment entering these streams during installation but would lead to a long-term decrease in sediment with the reduction in the number of low water fords. Both of these culverts would be placed in class 4 non-fish bearing streams. Increases in fine sediments in large amounts could decrease reproductive success of fish by filling interstitial spaces between spawning gravel, so a determination was made that this increased sediment "**May effect, but not likely to adversely affect**" mid-Columbia steelhead and "**May Impact**" native redband trout. Such impacts to steelhead and redband trout populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams and restricting use of low water fords and culvert installation to times when the channel is dry. Very little of this sediment is expected to reach areas occupied by Mid-Columbia Steelhead.

## *Cumulative Effects*

### Alternative 2

Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead and Management Indicator Species include redband trout and steelhead. Most activities discussed under cumulative effects for aquatic habitat have affected fish populations in these streams. Increases in temperature can lead to increased stress to fish and reduction in spawning and rearing success. An increase in sediment yields could potentially add to degradation of aquatic habitat and fish populations by:

- Increasing suspended sediment, which can have detrimental effects on fish health;
- filling interstitial spaces, which reduces escape and hiding cover for fish;
- increasing width/depth ratios, which can increase solar heating of water and also decrease fish hiding and escape cover and fish mobility;
- decreasing the quality of spawning substrate, which reduces reproductive success;
- reducing pool volumes, which decreases the amount of hiding, escape and resting habitat available and makes fish more vulnerable to predators.

Increases in sediment can increase stress on fish reducing spawning success, although whether the changes would be biologically significant would depend on many factors, including the amount and particle size of sediment produced, the size of the stream, amount of available refuge, including side channels and tributaries, and the conditions in the stream before the introduction of additional sediment. Fish in streams in good condition could tolerate more such changes than fish already stressed by poor habitat conditions. The contribution to cumulative effects of all action alternatives would be an increase of stress to redband trout due to the potential for sediment to be mobilized into creeks. Steelhead are far enough below activities creating sediment so that effects to this population would likely be unmeasurable.

Alternative 2 is consistent with Forest Plan direction regarding fish. None of the potential combined effects are expected to adversely affect PacFish Riparian Management Objectives or steelhead or redband trout population viability or designated critical habitat for steelhead. Application of PacFish direction would maintain or improve fish habitat conditions in the analysis area. Riparian and stream channel conditions would be expected to improve with installation of the two culverts and reconstruction of 7 miles of road that may be contributing excess sediment into streams and with future road decommissioning activities.

Consultation with NOAA Fisheries is necessary for fisheries due to the potential for effects to listed species within the analysis area. The Magnuson-Stevens Fishery Conservation and Management Act as amended (1996) does not apply to this analysis area because no Chinook are found in this subwatershed and essential fish habitat would not be affected by these activities.

### Alternative 3

Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead and Management Indicator Species include redband trout and steelhead. Most activities discussed under cumulative effects for aquatic habitat have affected fish populations in these streams. Increases in temperature can lead to increased stress to fish and reduction in spawning and rearing success. An increase in sediment yields could potentially add to degradation of aquatic habitat and fish populations by:

- Increasing suspended sediment, which can have detrimental effects on fish health;
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### Alternative 4

Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead and Management Indicator Species include redband trout and steelhead. Most activities discussed under cumulative effects for aquatic habitat have affected fish populations in these streams. Increases in temperature can lead to increased stress to fish and reduction in spawning and rearing success. An increase in sediment yields could potentially add to degradation of aquatic habitat and fish populations by:

- increasing suspended sediment, which can have detrimental effects on fish health;
- filling interstitial spaces, which reduces escape and hiding cover for fish;
- increasing width/depth ratios, which can increase solar heating of water and also decrease fish hiding and escape cover and fish mobility;
- decreasing the quality of spawning substrate, which reduces reproductive success;
- reducing pool volumes, which decreases the amount of hiding, escape, and resting habitat available and makes fish more vulnerable to predators.

Increases in sediment can increase stress on fish reducing spawning success, although whether the changes would be biologically significant would depend on many factors, including the amount and particle size of sediment produced, the size of the stream, amount of available refuge, including side channels and tributaries, and the conditions in the stream before the introduction of additional sediment. Fish in streams in good condition could tolerate more such changes than fish already stressed by poor habitat conditions. The contribution to cumulative effects of all action alternatives would be an increase of stress to redband trout due to the potential for sediment to be mobilized into creeks. Steelhead are far enough below activities creating sediment so that effects to this population would likely be unmeasurable.

Alternative 4 is consistent with Forest Plan direction regarding fish. None of the potential combined effects are expected to adversely affect PacFish Riparian Management Objectives or steelhead or redband trout population viability or designated critical habitat for steelhead. Application of PacFish direction would maintain or improve fish habitat conditions in the analysis area. Riparian and stream channel conditions would be expected to improve with installation of the two culverts and reconstruction of 7 miles of road that may be contributing excess sediment into streams and with future road decommissioning activities.

Consultation with NOAA Fisheries is necessary for fisheries due to the potential for effects to listed species within the analysis area. The Magnuson-Stevens Fishery Conservation and Management Act as amended (1996) does not apply to this analysis area because no Chinook are found in this subwatershed and essential fish habitat would not be affected by these activities.

## Biological Evaluation Determination of Effects and Rationale all action alternatives

The determination for Threatened, Endangered and Sensitive species are summarized in Table A-7.

## Mid-Columbia steelhead (MIS):

All action alternatives of the Sunflower Bacon Vegetation Management project "**May effect, but are not likely to adversely affect**" Mid-Columbia steelhead.

Rationale:

The reopening and blading of some native surface roads in Riparian Habitat Conservation Areas would require some soil disturbance near creeks (13 crossings). Though mitigation measures would minimize the amount of soil that reaches the stream channel, there would be a possibility of a negligible localized increase in sedimentation. These effects would be short lived and there would not be a large enough quantity of sediment to change any habitat parameters. Such impacts to steelhead populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams and restricting use of low water fords and culvert installation to times when the channel is dry. Very little of this sediment is expected to reach areas occupied by Mid-Columbia Steelhead. Alternative 3 and 4 would have fewer impacts to fish habitat through sediment input as no temporary roads would be constructed in RHCAs and no skidding or forwarding of trees would occur over stream channels. All other activities remain the same.

## Redband trout (MIS):

All action alternatives of this thinning project May Impact individuals or habitat for redband trout, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Rationale:

The reopening and blading of some native surface roads in Riparian Habitat Conservation Areas would require some soil disturbance near creeks. Though mitigation measures would minimize the amount of soil that reaches the stream channel, there would be a possibility of a negligible localized increase in sedimentation. These effects would be short lived and there would not be a large enough quantity of sediment to change any habitat parameters. Such impacts to redband trout populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams and restricting use of low water fords and culvert installation to times when the channel is dry. Alternative 3 and 4 would have fewer impacts to fish habitat through sediment input as no temporary roads would be constructed in RHCAs and no skidding or forwarding of trees would occur over stream channels. All other activities remain the same.

## Other Sensitive Species:

This project would have **no impact** on Pacific Lamprey, California floater, Columbia Dusky Snail, or Margined Sculpin.

**Rationale:**

These species are not present within the analysis area so would not be affected by the proposed actions.

Table A-7. Determinations for Proposed, Threatened, Endangered, and Sensitive aquatic species in the Sunflower Bacon Analysis Area.

| | Determination of Effects | | |
|---|---|---|---|
| Species | Alternative 2 | Alternative 3 | Alternative 4 |
| Pacific Lamprey | NI | NI | NI |
| California floater | NI | NI | NI |
| Columbia Dusky Snail | NI | NI | NI |
| Margined Sculpin | NI | NI | NI |
| Mid-Columbia Steelhead | ME | ME | ME |
| Interior Redband Trout | MI | MI | MI |

*ME=may effect, but not likely to adversely affect, MI=may Impact, NI=no impact*

# *BOTANICAL SPECIES*

## Introduction

This section incorporates by reference the Biological Evaluation for Plants listed as Sensitive and Biological Evaluation for *Silene spaldingii* for the Sunflower Bacon Analysis Area project contained in the project analysis file at the Heppner Ranger District. Analysis methodologies and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

## Biological Evaluation of sensitive plant species surveys

Complete species surveys were conducted in the project area and adjacent subwatersheds as follows:

- Wilson 1992
- Coffee Pot 1992
- Three Trough 1992
- Texas-Madison 1993
- Camp Moreland 1993
- Little Wall / Madison Allotment 2002
- Sunflower Bacon 2003

## Proposed, Endangered, Threatened, and Sensitive plant species

There are no known populations of Endangered, Threatened, or Sensitive plant species within or adjacent to the analysis area. While known to occur on the Umatilla National Forest, *Silene spaldingii* (federally listed as Threatened) occurs primarily in open grasslands with deep Palousian soils. This habitat does not exist in the Sunflower Bacon analysis Area.

As a result, this project would **Not Impact** any currently listed Region 6 Sensitive plant species. This project would also have **No Effect** on *Silene spaldingii*. This project would comply with Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

# RANGE

This section incorporates by reference the Sunflower Bacon Vegetative management Range Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

## Scale of Analysis

The Sunflower Bacon Vegetation Management Area is mostly in the Little Wall Allotment with a very small portion of the project area in the Hardman Allotment. For the purpose of discussing domestic livestock grazing, those portions of the Little Wall and Hardman Allotments that are within the Sunflower Bacon analysis area will be analyzed and the portions of the allotments that are outside the analysis area will not be discussed in detail.

### *Current Conditions*

#### Little Wall Creek Cattle Allotment

The Little Wall Creek Cattle Allotment currently permits 480 cow/calf pairs on the allotment from May 25th through October 19th and is divided into 10 pastures. These 10-pastures are managed under a deferred rest-rotational grazing strategy.

Table G-1. Pasture acres in the Sunflower Bacon Analysis Area.

| Allotment | Pastures | Acres Within The Analysis Area | Total Pasture Acreage | **Approximate Use Dates |
|---|---|---|---|---|
| Little Wall Creek | Bacon Creek | 1142 | 1142 | 07/15-10/19 |
| | East Matlock | 354 | 418 | 05/25-10/19 |
| | Hog Creek | 1229 | 8298 | 05/25-10/19 |
| | Keeney | 6185 | 6306 | 05/25-10/19 |
| | Little Wall | 565 | 565 | 07/15-10/19 |
| | Red Hill | 3710 | 7918 | 05/25-10/19 |
| | Sunflower | 6070 | 6609 | 05/25-10/19 |
| | Tupper Corral | 52 | 52 | 05/25-10/19 |
| | West Matlock | 7 | 248 | 05/25-10/19 |
| | Madison | 0 | 4275 | 05/25-10/19 |

***This date is the time of year that this area could be used through out the grazing season. Livestock would be in each pasture for a specified number of days each grazing season.*

#### Hardman Cattle Allotment

The Hardman Cattle Allotment permits 322 cow/calf pairs for approximately 122 days during a grazing season from June 1st through September 30th and is divided into 8 pastures. Only 2 pastures are part of the Sunflower Bacon Analysis Area: the East Wilson and the East Wildcat pastures. The other pastures will not be discussed in detail within this analysis.

Table G-2: Pasture acres in the Sunflower Bacon Analysis Area.

| Allotment | Pastures | Acres Within The Analysis Area | Total Pasture Acreage | **Approximate Use Dates |
|---|---|---|---|---|
| Hardman | East Wilson | 356 | 4,291 | 06/01-09/30 |
| | East Wildcat | 9 | 1,668 | 06/01-09/30 |

***This date is the time of year that this area could be used through out the grazing season. Livestock would be in each pasture for a specified number of days each grazing season.*

## *Direct and Indirect Effects*

### Effects Common to All Alternatives

Livestock grazing would continue to occur within the analysis area with current stocking levels and management techniques.

Table G-3: Increase in Transitory Range by Alternative

| | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Acres of Increased Access and Forage (Harvest Activity) Mechanical | Existing Condition | 2,456 | 1,451 | 2,062 |
| Acres of Increased Access and Forage (Harvest Activity) PCT | Existing Condition | 704 | 681 | 704 |
| Burning Acres (Mechanical) | Existing Condition | 956 | 937 | 995 |
| Burning Acres (Landscape) | Existing Condition | 10,196 | 8,617 | 9,347 |
| Road Closure | Existing Condition | | 2120-070 | 2120-070 |

### Alternative 1

Livestock grazing distribution on the uplands would stay the same or continue to decrease as stocking in timber stands grows denser and wood continues to accumulate on the ground. Livestock access would stay the same or continue to decrease due to down wood, continuous small regeneration, and visibility. Forage would also stay the same or continue to decrease due to the reduction of sunlight on the forest floor reducing forest floor vegetation.

The no action alternative would continue the buildup and decay of dead and down material that could result in large wildfire activity. The buildup of dead and down material, increased stems per acre could result in the reduction of available forage for domestic livestock and decrease the current livestock carrying capacity of the allotments.

### Alternative 2

Alternative 2 would increase livestock distribution on the two allotments by increasing access and/or increasing available forage for livestock. This would spread utilization of vegetation more evenly through the allotments and reduce soil and vegetation disturbance in areas of concentrated use.

Proposed burning could reduce the amount of forage in a one to two year period, however, after a one or two year recovery period those areas would be expected to be higher than the existing condition due to the reduction in competition from small trees and/or shrubs.  Proposed noncommercial thinning, commercial thinning, fuels reduction projects, and harvest could increase the amount of sunlight on the forest floor, stimulating grass growth and increasing the amount of available forage (transitory range) for domestic livestock.  These treatments would also remove down wood and decrease stand densities, which currently limit access and visibility for both livestock and livestock managers in portions of the analysis area.  Management of livestock would improve with the proposed action due to increased visibility and access for livestock herding.

An increase in distribution of livestock on the uplands could decrease the amount of use on riparian areas within the analysis area.

Proposed harvest, commercial thinning, noncommercial thinning, fuels treatments, and burning could reduce the effectiveness of fences (which are used as a tool to manage livestock in portions of the allotment at specific times).  However, the identified mitigation under all the proposed action would protect fences in their existing condition to prevent livestock movement between pastures. Noncommercial thinning has caused concern and injury to horses (saddle and pack horses) that the permittees ride on the allotment to manage livestock.  Injury is caused by small trees that are cut at an angle leaving sharp stubs that are left sticking out of the ground that animals step on.

#### Alternative 3

The direct and indirect effects associated with Alternative 3 are the same as described under Alternative 2, the difference being, closing road 2120-070.  This road system is used by the permittee to manage livestock in the Red Hill Pasture of the Little Wall Allotment.

#### Alternative 4

The direct and indirect effects associated with Alternative 4 are the same as described under Alternative 2, the difference being, closing road 2120-070.  This road system is used by the permittee to manage livestock in the Red Hill Pasture of the Little Wall Allotment.

### *Cumulative Effects*

#### Alternative 2

The proposed treatments could permit more frequent and widespread use of prescribed fire in the future.  This could result in long term improvements in forage and accessibility for livestock.

#### Alternative 3

The cumulative effects associated with Alternative 3 are the same as the proposed action, the difference being, closing road 2120-070.  With out the use of the road to move livestock or access that portion of the allotment the 2120-140 road would need to be improved to allow the continued management of livestock on the Red Hill Pasture of the Little Wall Allotment.

#### Alternative 4

The cumulative effects associated with Alternative 4 are the same as the proposed action, the difference being, closing road 2120-070.  With out the use of the road to move livestock or access that portion of the allotment the 2120-140 road would need to be improved to allow the continued management of livestock on the Red Hill Pasture of the Little Wall Allotment.

# NOXIOUS WEEDS

## Scale of Analysis

The Sunflower Bacon Analysis Area is currently within the scope of the Wall Ecosystem Analysis. Issues with noxious weeds that were identified in the Wall Ecosystem Analysis have been included in the Sunflower Bacon Analysis Area.

## Priority Noxious Weeds

## Existing Conditions

Table N-1 shows noxious weeds of concern within the Sunflower Bacon project area and their associated priority category.  Several categories are used to prioritize noxious weed species on the Forest list for treating and inventorying:

1. "Potential Invaders" are noxious weed species that occur on lands adjacent to the Umatilla National Forest but which have not been documented on lands administered by the Forest;
2. "New Invaders" are noxious weed species that occur sporadically on the Umatilla National Forest and which may be controlled by early treatment.  This category has been split into two subcategories due to changes in weed populations on the Forest in the last two years:
   a. "New Invaders" are of limited distribution and can probably be eradicated if early treatment can be implemented.
   b. "New Invaders/Established are those species that are presently controllable but which are approaching "Established" and which are prioritized for early treatment.
3. "Established" species are widespread across the Forest in large populations and containment strategies are used to prevent their further spread.

Table N-1:  Noxious Weed Species and Treatment Priority

| Species | Common Name | Treatment Priority |
|---|---|---|
| *Centaurea diffusa* | diffuse knapweed | New Invader/Established |
| *Centaurea biebersteinii* | spotted knapweed | New Invader/Established |
| *Linaria dalmatica* | Dalmation Toadflax | New Invader/Established |
| *Linaria vulgaris* | Yellow Toadflax | New Invader/Established |
| *Cynoglossum officinale* | hound's tongue | New Invader/Established |
| *Hypericum perforatum* | St. Johnswort | Established |
| *Cirsium arvense* | Canada thistle | Established |
| *Cirsium vulgare* | bull thistle | Established |
| *Ventanata dubia* | Ventanata | New Invader/Established |

## Current Weed Populations

Existing high priority weed sites are relatively small in size as well as density within the Sunflower Bacon analysis area. There are currently 67 high priority (New Invader/Established) sites. Diffuse Knapweed, is the primary weed inventoried at these site. Of these 67 sites, 11 are approved for treatment under the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995 Forest EA).

The low priority "established" weeds—are Canada thistle, bull thistle, and St. Johnswort—are fairly widespread within the analysis area and are so extensive Forest-wide that they are not generally inventoried. St. Johnswort and bull thistle are less invasive and/or persistent than the high priority weeds and generally give way to or do not out-compete desirable vegetation. It can be assumed that these three weed species can be found throughout the analysis area.

## Disturbance and Spread

Most of the noxious weed sites are found along road corridors. From these points of initial infestation, weed species become opportunistic in invading suitable microhabitats adjacent to the initial infestation site. Most of the noxious weed species of the Umatilla National Forest thrive in open full sunlight in disturbed soils in which native species have been diminished or displaced (conditions commonly associated with roads). Conversely, a few noxious weed species will tolerate shade (most notably hound's tongue, and to a lesser extent, spotted knapweed) and can invade understory habitat. Most of the noxious weed species found in the analysis area are easily spread by vehicle traffic making road corridor weed sites of high concern. Diffuse Knapweed is of most concern within the analysis area. Spotted Knapweed Diffuse Knapweed, Dalmation Toadflax and Yellow Toadflax are spread by animals, wind, and vehicles, are extremely competitive, and are generally found along roads and right of ways. However, inventory has shown the spread of these species to be relatively slow due to current treatment practices. There are 67 inventoried knapweed sites in the analysis area. Due to the low amounts of weeds within the analysis area, current threat of spread is low.

Low priority weed species, such as Canada thistle and bull thistle, also readily establish where soil and plant associations have been disturbed. These species, however, are not highly persistent and populations usually decline as the tree canopy closes and/or with competition from seeded/native species.

## Current Cost of Weed Treatment

The current costs for noxious weed control within the analysis area are estimated to be approximately $2000/year. This figure includes personnel, equipment, treatment, inventorying, and monitoring.

## Environmental Consequences

Table N-3 describes the costs of weed management by each alternative. Direct costs of mitigation measures, which would provide for prevention and treatment of noxious weed infestations are shown in the table. (Note: all of the measures under these alternatives which provide for prevention of noxious weed infestations are not described in this table because those measures also meet other objectives such as maintaining soil productivity on site, and maintaining water quality.)

Table N-3. Cost of Noxious Weed Management

| | Costs ($) | | | |
|---|---|---|---|---|
| | No Action | Alternative 2 | Alternative 3 | Alternative 4 |
| Noxious weed identification material | 0 | 50 | 50 | 50 |
| Known noxious weeds infestation map | 0 | 300 | 300 | 300 |
| Noxious weeds analysis as a factor of concern in NEPA | 2,000 | 2,000 | 2,000 | 2,000 |
| Inspection of site and travel routes (includes inventory | 0 | 5,000 | 5,000 | 5,000 |
| Equipment cleaning | 0 | 800 | 800 | 800 |
| Noxious weed monitoring throughout project | 2,000 | 5,000 | 5,000 | 5,250 |
| Treatment throughout project | 6,000 | 10,000 | 10,000 | 10,000 |
| Total | 10,000 | 23,150 | 23,150 | 23,150 |

## Effects Common to All Alternatives

### *Direct and Indirect Effects*

The potential for noxious weed establishment and spread from vehicles not associated with the project along open road corridors would continue to exist in all alternatives.

Treatment of the existing noxious weed sites covered in the 1995 Forest EA within and adjacent to the analysis area would receive continued effective treatment throughout the length of the project.

Low priority weed species that are not inventoried would continue to be found throughout the analysis area and would not be treated.

The potential for livestock and wildlife to transport noxious weed seed from within or from outside the analysis area would exist in all alternatives.

Burning open pine and grass plant associations would continue the spread of annual introduced grasses.

## Effects Common to All Action Alternatives

### *Direct and Indirect Effects*

There are currently 67 high priority weed sites located within the analysis area, of which eleven were approved for treatment under the 1995 Forest EA (the other sites having been located after 1995).

The proposed activities could increase the potential for noxious weed invasion where the surface duff layer is disturbed and exposed down to bare mineral soil. The highest risk of infestation would be in disturbed forest areas (even shaded understory habitats), where disturbance exists along transportation corridors. However, compared to the other areas of the Heppner Ranger District and the Umatilla

National Forest, the Sunflower Bacon area does not have high densities of noxious weeds. Private land that is directly adjacent to the National Forest has not been inventoried but contain infestations of high priority weeds (Diffuse and Spotted Knapweed, Dalmation and Yellow Toadflax, Sulfur Cinquefoil, and Scotch Thistle).

Table N-2. Disturbance and Noxious Weed Spread by Alternative

| | Acres of Activities | | | |
|---|---|---|---|---|
| | No Action | Alternative 2 | Alternative 3 | Alternative 4 |
| Treatment Acres<br>-Forwarder<br>-Skidder<br>-PCT | 0 | 3160 | 2285 | 2761 |
| Road reopening<br>-Temp<br>-Closed<br>-Open<br>-Reconstruction | <br>0<br>0<br>0<br>0 | <br>4.0<br>15.7<br>33<br>8 | <br>2.4<br>15.7<br>32<br>8 | <br>3.8<br>15.7<br>33<br>8 |
| Burning Acres<br>-Mechanical<br>-Wet or Handline | <br>0<br>0 | <br>5.5<br>4.4 | <br>7<br>6.5 | <br>6.0<br>5.7 |
| Probability of increase in establishment and spread of noxious weeds.<br>(0=low, 5= high) | 1 | 3+ | 3+ | 3+ |

Many methods would be used to reduce the potential of noxious weed establishment and spread. All known noxious weed sites that are cleared for treatment would be monitored and treated before any project activities begin. This mitigation would eliminate existing known weed sources, which would effectively reduce the spread of noxious weeds. Noxious weed maps also would be given to local personnel working on the Sunflower Bacon project to increase awareness of noxious weeds for early detection of unknown sites in the area.

All equipment associated with treatment would be cleaned prior to arriving on site. If equipment were to arrive on site without having met this requirement, the equipment would be required to leave the site until this requirement is met. This would reduce the potential for noxious weed seeds to be transported on site by equipment associated with the project.

Heavy equipment would be required to stay on designated trails to reduce total soil disturbance within treatment units. Low ground pressure machines would also be used where appropriate to minimize soil compaction and soil disturbance. Equipment would only be allowed to work when soils are dry or frozen to reduce soil erosion and disturbance. If mineral soil becomes exposed, it would be seeded, where appropriate, using noxious weed-free seed to establish vegetative competition that would reduce the potential for establishment and spread of noxious weeds.

Treatment of weed sites would incorporate management strategies as outlined in the *Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005 (R6 2005 FEIS).* Early treatment of noxious weed sites would be limited to manual treatment methods (as defined in the

1995 Forest EA). Corrective and maintenance strategies (as defined in the 1995 Forest EA and the R6 Guide to Vegetation Management Projects) would be generally employed in established infestations (as defined in the 1995 Forest EA). As a result, all the action alternatives would be consistent with the Forest Plan, Regional FEIS for Managing Competing and Unwanted Vegetation, the associated Mediated Agreement, the Guide for Conducting Vegetation Management Projects in the Pacific Northwest Region (R6 Guide to Vegetation Management Projects), the Land and Resource Management Plan for the Umatilla National Forest (LRMP), and the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995 Forest EA).

### *Cumulative Effects*

Past road construction and maintenance, grazing, timber harvest and other soil disturbance have provided:

- environments for noxious weed species establishment,
- vectors for noxious weed dispersal,
- and infestations of noxious weeds for seed sources.

See Appendix F for a complete list of past, present, and future projects that were considered when determining which actions could cumulatively interact with the action alternative treatments.

The cumulative effects of all action alternatives on the establishment and spread of high priority noxious weeds would be low to moderate. Past activities within the analysis area have resulted in extremely low densities of high priority noxious weeds. Known sites would be treated before seed is produced and before additional disturbance occurs to reduce the potential spread by equipment associated with this project and other vectors (such as livestock, recreationists, wildlife

The cumulative effects of all action alternatives on the establishment and spread of low priority noxious weeds is greater than that of high priority noxious weeds, due to the lack of treatment on those species. Low priority noxious weeds are those species that are considered widespread throughout the forest and generally are less competitive. Low priority noxious weeds within the analysis area (bull thistle, Canada thistle, and St. Johnswort) are generally less persistent than high priority weeds and are out competed by forest canopy and competing understory vegetation, resulting in a reduction of these weed species in higher seral stage plant associations. The proposed treatment methods and mitigation would minimize ground disturbance, which would allow the existing competing vegetation to reduce the spread and establishment of low priority weeds.

As identified in the Range Report for Sunflower Bacon, all action alternatives could increase the accessibility and distribution of livestock (as well as wildlife and recreationists). Since these are vectors for transport of weed seeds, this increased accessibility could result in cumulative spread of noxious weed populations. However, mitigation identified would inventory for new sites, minimize soil disturbance, and monitor for weed populations for five years after proposed treatments are completed. As a result, there should be little opportunity for transported seeds to become established.

# RECREATION

## Introduction

This section incorporates by reference the Sunflower Bacon Recreation Report contained in the project file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the alternatives are discussed in this section.

## Scale of Analysis

The scale of analysis for recreation resources is the Alder/Upper Skookum subwatershed and any dispersed campsite that is directly adjacent to the subwatershed boundary.

## Camping

### *Current Condition*

There are 18 inventoried dispersed camping sites and no developed recreation sites within the analysis area and 3 dispersed camping sites adjacent to the area. Most of the disperse camping occurs on the 2202 and 2120 outside of any treatment areas. Dispersed camping has traditionally been a popular activity in the area, particularly during the big game hunting seasons. Dispersed camping and hunting are the major recreation activities occurring in this area.

Table R-1 Dispersed Campsites by Management Area

| Management Area | Recreation Opportunity Spectrum | Number of sites |
|---|---|---|
| E1 | Roaded Modified | 13 |
| C3 | Roaded Modified | 5 |

### *Direct and Indirect Effects*

#### Alternative 1

Overall recreation use within the analysis area would remain near the same levels as previous years with this alternative. In the long term, recreationists may not be able to enjoy the same quality experience if the landscape significantly alters due to non-treatment of tree stands, which could result in catastrophic fire.

#### Alternative 2

As with Alternative 1, overall recreation use would remain near the same levels as previous years with implementation of Alternative 2, 3, or 4. The proposed thinning and burning projects listed in these alternatives would not have negative impacts for dispersed recreation sites located within the analysis area. A possible impact to users could occur if a specific dispersed campsite should become temporarily unavailable during project implementation. However, this is mitigated with the availability of numerous dispersed campsites within the analysis area and surrounding lands for campers to utilize if temporary displacement should occur. Not all sites would receive treatment at the same time.

Table R-2: Dispersed camp sites that could be affected by project activities

| | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Dispersed Camp sites in/near harvest units | 7 | 3 | 3 |
| Dispersed camp sites in/near burn blocks | 16 | 15 | 14 |

During fall burning operations, hunters or other recreationists may experience some inconvenience due to smoke in the air. Spring and fall burning is of short duration and is a management practice that forest visitors should expect during this time period. The Umatilla National Forest Public Affairs office and the Heppner Ranger District office can supply visitors with information about locations of prescribed fire. Roads are posted with signs to inform users of planned burns.

The positive recreation benefits of implementing this proposal include a healthier forest environment for recreationists to enjoy and increased protection of dispersed campsites and recreation activities through lessening the likelihood of large unwanted fire within the planning area.

#### Alternative 3

Fewer dispersed camp sites would be near harvest and thinning units which would give the camper a greater selection of sites away from activity. One less campsite is near burning blocks although the effects from smoke would be the same as under alternative 2.

#### Alternative 4

The number of available camp sites away from harvest and thinning activity would be the same as under alternative 3. Two less campsites are near burning blocks although the effects from smoke would be the same as under alternative 2 and 3.

### *Cumulative Effects*

Destination recreation has increased as a result of the Morrow County OHV Park to the west of the project area. The park provides a campground for the users although some users are expected to move onto the National Forest as their preferred camp site or as overflow camp sites. This anticipated increase in dispersed campers may add increased pressure on the limited number of sites available during project implementation. Other recreation is expected to continue at the current level. No other projects occurring in the analysis area should affect dispersed camp site availability.

## Hunting

### *Current Condition*

Hunting season typically begins in August with the bow hunting season. Big game hunting seasons start in October and extend through November. An increase of turkey hunting has been observed in this area in the spring starting in April. Access to this area is described in the Motorized Access and Travel Management Plan for the Heppner Ranger District.

### *Direct and Indirect Effects*

#### Alternative 1

Hunting seasons would continue as designated by the Oregon Department of Fish and Wildlife. Habitat and changes to populations are discussed in the Terrestrial Wildlife section of this document and in the

Terrestrial Wildlife report in the project file. Access to the area would not change during any of the hunting seasons on the Heppner unit.

#### Alternative 2

Access to the area would not change during any of the hunting seasons on the Heppner unit.

#### Alternative 3

A change to hunting would be access to the 2120-070 which is proposed to be closed year round in alternatives 3 and 4. This should not have a great impact due to the location of the 2120-140. The 2120-140 would still be open April 16 through November 30. It is felt this should reduce game disturbance and improve hunting.

#### Alternative 4

With the closing of the 2120-140 road the effects to hunting should be the same as described in alternative 3.

### *Cumulative Effects*

The Motorized Access and Travel Management Plan for the Heppner Ranger District has designated the current road access in the analysis area. There are no reasonably foreseeable future changes to road access in the analysis area.

## *CULTURAL RESOURCES*

This section incorporates by reference cultural resource surveys contained in the Heritage file at the Heppner Ranger District.

### *Current Condition*

A review of the Heppner Ranger District files indicates that the majority of the Sunflower Bacon analysis area has been surveyed. The Three Trough Survey in 1993 surveyed approximately 13,780 acres and resulted in the discovery of 7 new sites and 10 isolated occurrences. In addition, the survey rerecorded 26 previously recorded prehistoric sites and 6 historic sites. One suspected historic site was located and recorded.

The prehistoric sites, or Native American sites, include evidence of tool manufacturing activities that may be related to hunting and root and berry collecting camps. The distribution of sites and isolated occurrences indicate a possibility of routinely used travel routes or corridors with the area, probably to access food resources, camps, and other special interest areas. The historic sites or Euro-American sites are generally related to homesteading and grazing activities and include cabins and other dwellings.

### *Direct and Indirect Effects*

#### Alternative 2, 3, and 4

A review of the Umatilla National Forest heritage files indicates the current project area has been surveyed numerous times over the years. The most comprehensive survey that encompassed the entire project area is the Three Troughs Planning Area inventory conducted by Moody in 1993. Several additional inventories were conducted on portions of the proposed project area after the Three Troughs Planning Area inventory. These include the following:

| | |
|---|---|
| SUBSOILING AND MECHANICAL THIN | Keith (1993) |
| GATES AND BARRICADES, GUARDRAILS | Bowers (1993) |
| 26F SUBWATERSHED INVENTORY | Grigsby (1994) |
| WILSON T. S. ADDENDUM | Keith (1994) |
| SKOOKUM PINE COMMERCIAL THIN | Popek (1995) |
| WILSON CREEK PLANNING AREA | Jaehnig (1995) |
| TUPPER INVENTORY | Jaehnig (1995) |

The survey of the Three Troughs Planning Area project was accomplished under the direction of contract Archaeologist Ula Moody, Ph.D., Principal Investigator, from July 17 to August 1, 1992. Moody was assisted by 21 field archaeologists. Parallel survey transects were spaced no more than 15 meters apart. All areas less than 15% slope were surveyed in this manner. The entire planning area encompassed 20,214 acres of which 13,780 acres were actually surveyed, 68% of the planning area. The inventory resulted in the discovery of 7 new sites and numerous new isolated artifacts. In addition the inventory including revisiting 26 previously recorded sites and the recording of one previously suspected site.

The above survey followed the Umatilla National Forest Inventory strategy and can be accurately replicated from report maps and descriptions. It is considered adequate by current standards.

There are 35 known or suspected sites which have the potential to be affected during the proposed activities in the Sunflower Bacon analysis area. Eight of the sites were occupied solely during the historic period and 1 was occupied during both the historic and prehistoric periods. None of these sites have been evaluated for their eligibility to the National Register. The remaining 26 sites are prehistoric. Three of the prehistoric sites are considered not eligible, 3 have not been evaluated while the remaining 20 sites are considered eligible based on the Lithic Scatter Programmatic Memorandum of Agreement (PMOA).

Thirteen of the 35 known or suspected sites are located in the vicinity of the commercial and pre-commercial cutting units within the Sunflower Bacon Timber Sale project boundary. Two of the sites are historic and have not been evaluated while the remaining 11 sites are prehistoric. Two of the prehistoric sites have not been evaluated, and nine have been determined eligible for inclusion on the National register based on the Lithic Scatter PMOA. All of these sites would be avoided during project activities by either excluding them from the cutting units or by flagging those that occur away from the edge of units.

Twenty four of the 35 known or suspected sites are located in the vicinity of the proposed road maintenance, road reconstruction and temporary road construction. Seven of these sites are historic and one was occupied during both the historic and prehistoric periods. None of these sites has been evaluated for eligibility for the National Register. In addition, there are 16 sites that were occupied during the prehistoric period, 14 of which have been evaluated as eligible for the National register. One prehistoric site has been determined to be not eligible while the last prehistoric site has not been evaluated. All of these sites would be avoided by the proposed road maintenance, road reconstruction and temporary road construction activities.

Twenty nine sites are located in the area of proposed fire projects, either pile burning in the cutting units, landscape burning or fireline construction. Nine of these sites are historic, none of which have been evaluated for eligibility for the National register. Twenty of the sites are prehistoric. Sixteen of the prehistoric sites have been determined eligible for the National Register while 3 have been found to be not eligible and one has not been evaluated. Those sites which have features or material which may be affected by the burning activities would be blacklined to avoid the fire from affecting those attributes. Sites which may be near proposed firelines would be avoided.

## *AIR QUALITY*

This section incorporates by reference the Sunflower Bacon Air Quality Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

### Scope of the analysis

This analysis focuses on the project area and takes into consideration local communities located within a 50-mile radius of the project area. Communities located within this area are Long Creek, Monument, Spray, Ukiah and Fox.

This analysis also takes into consideration areas outside of the 50-mile radius that could be affected by smoke emissions and dispersion from larger fires. These areas are the communities of John Day, La Grande, North Powder and Baker City and Class 1 airsheds. These airsheds are the Strawberry Mountain Wilderness and the Eagle Caps Wilderness.

#### *Current Condition*

On any given day the air quality of the analysis area is generally fresh, clean and clear. Visibility of the area is excellent with geographical features visible for great distances.

Seasonal agricultural burning is an activity that can impact air quality. Agricultural burning occurs during the spring and fall months of the years. Within a short time frame, when burning conditions are conducive, farm field and canals are set a fire and allowed to burn for days. Because smoke emissions from these burns are cumulative, the result can be a temporary degradation of air quality by a reduction in visibility and a build up of human health irritants. These conditions are short term and usually last only a few days.

There are no Class I airsheds located within a 50-mile radius of the project area. The North Fork John Day Wilderness, which was established by the Oregon Wilderness Act of 1984, is a class II airshed and does not require the same air quality protection as those identified as Class I Wilderness airsheds.

Visitor road use creates dust emissions in to the air for short periods of time. These conditions are much more noticeable during the fall months when road conditions are dusty and dry. During fall hunting season, warming fires from hunter use create smoke and releases emissions into the air. Smoke from these warming fires is cumulative and can result in a decrease in visibility and can cause a local health hazard from smoke because of air associated with the fall months.

## Direct and Indirect Effects

### Alternative 1

This alternative would maintain the area as described in the existing conditions. However, ground fuels would continue to accumulate and the risk for pollutants from wildfire would continue to exist.

Seasonal lightning caused wildfires would continue to occur with the potential of becoming large with the accumulation of ground fuels. Large uncontrolled wildfires would produce approximately, twice as much smoke as prescribed fire in a shorter time period. Large amounts of smoke impact air quality, visibility, communities and human health. Effects of smoke from large wildfires can last for days to months.

### Alternative 2, 3, and 4

Prescribed burning on a landscape scale would be used to reduce and eliminate the undesired ground fuels in the project area. Smoke from prescribed burning would temporarily cause impacts to air quality during the spring and fall months.

With the use of prescribed burning, there would be a notable increase in the amount of smoke produced during weather conditions conducive to underburning. Spring burning generally produces a blue haze smoke and reduces visibility to 20 miles or more. Spring time smoke would normally last only a few days and dissipate. Fall buns, which are conducted when fuels are much drier, would consume greater portions of the available fuel on the ground and reduce visibility to 15 miles or less. Because these burns are much hotter, smoke from these burns usually rises above the higher ridges and travels north and northwest. However during night time, residual smoke from smoldering material tends to settle in drainage bottoms and travels to lower elevations.

Table P-1. Proposed Burning in Acres

| Alternative | | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 4 |
|---|---|---|---|---|---|
| Landscape Burning | acres | 0 | 10,196 | 8,617 | 9,347 |
| Activity Burning | acres | 0 | 234 | 243 | 273 |
| Pile Burning | acres | 0 | 22 | 13 | 18 |

Emission calculations were based on burning the proposed acres over a 5 year time frame. Generally we can burn around 2,000 acres a year. These burns could take from 1 day to several days for the ignition process to be completed. A wildfire under the right conditions could burn the total acreage in 1-2 days.

Table P-2. Emissions PM 10 and PM 2.5 Produced (tons):

| Alternative | 1 | 2 | 3 | 4 | Wildfire |
|---|---|---|---|---|---|
| *Landscape Burning* | | | | | |
| PM10 | 0 | 1,084 | 916 | 994 | |
| PM2.5 | 0 | 1,046 | 884 | 958 | |
| *Activity Burning* | | | | | |
| PM10 | 0 | 45 | 47 | 52 | |
| PM2.5 | 0 | 42 | 43 | 49 | |
| *Piles Burning* | | | | | |
| PM10 | 0 | 3 | 3 | 3 | |
| PM2.5 | 0 | 3 | 3 | 3 | |
| *Total Emission* | 0 | 2,223 | 1,896 | 2,059 | 4,414 |

## *Cumulative Effects*

### Past Activities

Portions of the analysis area have been burned during the last 17 years. These burns ranged from a few hundred acres to several thousand. They were considered maintenance burns which help to reduce fine fuels and occur on a 7-10 year cycle. These burns consumed fine fuels and a small portion of the medium diameter fuels.

### Present and Reasonably Foreseeable Activities

- Prescribed burning from Rimrock, Wildhorse and Ant timber sales, (Landscape and activity burning)
- Prescribed burning from Mallory Wildlife Enhancement Prescribed Burn (Landscape prescribed burn)
- Prescribed burning from Bologna Basin and Kahler timber sales (Activity burning)

Cumulative effects of pollutants PM10 and PM2.5 in the airshed would happen if two project areas were burned within 1-2 days of each other. Smoke impacts would be mainly at night when the nighttime winds flow down drainage and down valley and settle in low spots within the 50 mile radius of the project area. Day time winds would generally disperse the smoke throughout the day and smoke would settle at night again. The Oregon Smoke management plan would be followed and no burning would take place if restricted by the plan, or any restrictions were forecasted by the Oregon smoke management forecasters.

# VISUAL QUALITY

## Scope of the Analysis

Forest Plan direction defines individual standards for Management areas. Management areas A4, C1, C3, and E1, would receive treatment that may affect visual quality therefore the analysis will only discuss these four areas within the Forest boundary of the Alder/Skookum subwatershed.

## A4 Viewshed

### *Current Condition*

66 acres of A4 viewshed occurs along FS road 2100-000. This area is along FS road 21 and is generally an open stand with large trees. Evidence of many activities can be seen, including; roads, fences, powerlines, stumps, and camp sites. Form is open, line is diverse, color includes vegetation, man made linier structures and roads, and texture is varied with conifer, grass and shrubs.

### *Direct and Indirect Effects*

#### Alternative 1

Ongoing activities of fire suppression, recreation, grazing, and firewood gathering would continue. The foreground and middleground visual quality of the forest vegetation and the landscape would continue to be altered by process of insect and disease and human use. The background would not see much change in visual quality unless a large scale wildfire or large scale insect outbreak occurs.

#### Alternative 2

The A4 Viewshed management area would have 18 acres of commercial thinning in each of the action alternatives. Because this is a thinning from below and various species and tree sizes would remain in a scattered pattern the management objectives of partial retention in the foreground and modification in the middle and background would be met. The changes of landscape would be of such size, amount, intensity, direction, and pattern that a natural appearing or slightly altered appearance would remain. In the first two to five years following treatment the changes in form, line, color, and texture would be noticeable but as ground vegetation grows the visibility of disturbed soil and stumps would be diminished. These short term changes would lead toward the long term goals of continued forest health and vigor, and to encourage a park-like, near natural appearance with big trees in the immediate foreground.

Landscape burning would increase changes in color in the first year or two, usually considered undesirable by the public, but after spring green-up in the following year the visibility of black ground and tree boles would be reduced. The overall visual effect of the landscape burning would increase the visibility of the large trees and the open park like stands.

#### Alternative 3

Same as alternative 2

#### Alternative 4

Same as alternative 2

## C1 Dedicated Old Growth

### *Current Condition*

1,052 acres of C1 Dedicated Old Growth occurs within the project area. This area is forested with large trees and large down wood. Form is of spaced large trees and down wood, site distance is obstructed by multi layered canopy, line color, and texture are minimized by vegetation.

### *Direct and Indirect Effects*

#### Alternative 1

Ongoing activities of fire suppression, recreation, grazing, and firewood gathering would continue. The foreground and middleground visual quality of the forest vegetation and the landscape would continue to be altered by process of insect and disease and human use. The background would not see much change in visual quality unless a large scale wildfire or large scale insect outbreak occurs.

#### Alternative 2

No thinning would occur within the dedicated old growth allocation therefore there would be no change in the visual quality from this action. Landscape burning would occur on 228 acres. This burning would create an increase in line and texture by removing a portion of the understory trees and other ground vegetation. The black color created from the burning would be masked after spring green-up and the color change would be visible for one or two years. The underburning would not remove the characteristics of the old growth stands and they would remain natural appearing stands of over mature trees with visible evidence of decay.

The use of landscape fire would comply with forest plan standard to maintain a natural appearing (retention) landscape. Visual quality would be subordinate to old growth habitat goals. See the terrestrial wildlife report for further discussion of old growth stand effects.

#### Alternative 3

Same as alternative 2

#### Alternative 4

Same as alternative 2

## C3 Big Game Winter Range and E1 Timber and Forage

### *Current Condition*

9,967 acres of C3 Big Game Winter Range occurs within the south half of the project area. This area is patches of conifers ranging form 8 to 16 inches. Form is of clumps of co-dominate trees with open spaces containing small sapling size conifers with grass and shrub understory, line color, and texture are minimized by vegetation.

6,937 acres of E1 Timber and Forage occurs within the north half of the project area. This area is similar to C3 with larger patches of open space. Form is of clumps of co-dominate trees with open spaces containing small sapling size conifers. The grass and shrub understory is minimal, line is minimized by vegetation, color is minimized by vegetation, and texture is large patches of conifer vegetation and open grass land.

## Direct and Indirect Effects

### Alternative 1

Ongoing activities of fire suppression, recreation, grazing, and firewood gathering would continue. The foreground and middleground visual quality of the forest vegetation and the landscape would continue to be altered by process of insect and disease and human use. The background would not see much change in visual quality unless a large scale wildfire or large scale insect outbreak occurs.

### Alternative 2

Over 2,000 acres of forested stands would be commercially thinned within the C3 Big Game Winter Range and over 400 acres in E1 Timber and Forage. In the foreground and middle ground this would create an increase in form and line by increasing the space between tree boles and reducing understory vegetation. Texture would remain the same with only a slight change in species composition. Color would change after treatment. Spring and fall colors would be increased with the increase in the percentage of western larch and a decrease in the percentage of Douglas-fir and grand fir.

Connected actions to this treatment include road use, temporary road use and the treatment of slash created during the thinning process. The increase in road use would increase the diversity of color in the background because vegetation that is currently on these roads due to low use would be removed either from maintenance or from increased use for harvest and haul purposes. After the treatment is completed these roads would become reestablished with vegetation and the color diversity would again be reduced. This would be accomplished over a two to five year period.

Thinning slash would be visible in the foreground and middle ground as needles brown. Treatment of this slash would occur in 1 to 5 years following thinning. After treatment this change in color would not be noticeable except in the foreground until understory vegetation increases to mask any remaining woody residue.

An additional 10,196 acres of prescribed burning would further reduce ground and understory vegetation creating an increase in open space resulting in an increased difference in form and line. The forest would remain dominated by conifer overstory and an herbaceous understory. Because all the prescribed burning would not occur within the same season or same year and a mosaic pattern of color change on the forest floor would occur on a yearly basis for about 5 consecutive years. After spring green-up this change in color would diminish.

Connected actions to this treatment include burning control lines. These lines would be constructed by hand or equipment. Bare soil would create changes in color in the middle ground but would not likely be visible in the background due to the width and shape of the lines. After burning is complete these lines are rehabilitated to a near natural state. Color changes would last one year after the burning season.

Noncommercial thinning on 704 acres would reduce stand density but because these stands contain small trees the changes in line and form would not be as noticeable as changes in the commercial harvest stands. Individual tree boles would not dominate the foreground. Texture changes would be noticeable because the spacing between individual trees would increase resulting in a more open stand than previously seen. Color would remain consistent because the tree canopy would remain at the same height as prior to the thinning and the foliage would still be seen as a mass of green. The residue from the thinning would be on the ground and would only be noticeable in the foreground for 1 to 5 years. After about ten years, as the stands grow and the understory becomes more predominate, the residue would be masked and unnoticeable.

#### Alternative 3

The only difference in visual quality would occur in the total amount of area that is treated. All visual changes in form, line, color, and texture would be the same as under alternative 2.

#### Alternative 4

The change in alternative 4 that would alter visual quality is the change in harvest prescription between the thin from below treatment to a more defined variable density thinning on the 476 acres that are within the C3 Big Game Winter Range management area. The areas prescribed with variable density thinning would result in form that is clumpy and line would be reduced as individual boles would not stand out to be as visible in the fore and middle ground as they are under alternative 2 and alternative 3. In the E1 timber and Forage management area the only difference in visual quality would occur in the total amount of area that is treated.

## *Cumulative Effects*

### Past Activities

Past activities have led to the existing visual quality of retention to maximum modification. The degree of modification is mosaic across the forest. Past activities include timber harvest, grazing, prescribed fire, tree planting, thinning, road building and maintenance, recreation, and gathering of small forest products, including fire wood.

### Present and Reasonably Foreseeable Activities

Present and reasonably foreseeable activities that affect visual quality are grazing and associated management, road maintenance, recreation, fire suppression and firewood cutting. There are no reasonably foreseeable future activities planned for this project area that are not ongoing at this time.

The effects of this project combined with ongoing projects would result in little change in form and texture of the forest beyond that from the project itself. Line would continue to increase as snags are cut for firewood and campfires. Road maintenance and recreation would be more visible with the decrease in forest vegetation. When ladder fuels are removed camp sites and forest user visibility would increase. Road maintenance would also be more visible as color changes from blading and brushing would be more visible after stand density and ladder fuels are reduced. Grazing may reduce forest vegetation that is concealing stumps from the harvest activities. This would be important in the A4 viewshed management area where forest management activities should remain visually subordinate in foregrounds.

# AREAS WITHOUT ROADS

## Skookum Roadless Area

## Scope of the Analysis

The measure for effects in the Skookum Roadless Area would include sight and sound from management activities.

### *Current Condition*

A portion of the Skookum Roadless Area is located in the southern portion of the subwatershed. The area currently identified in the Blue Mountain Forest Plan revision process is unchanged for the existing Skookum Roadless Area (http://www.fs.fed.us/r6/uma/blue_mtn_planrevision/documents/roadless22x24_006.pdf).

### *Direct and Indirect Effects*

#### Alternative 1

No activities from the Sunflower Bacon project would occur within this roadless area so there would be no effects from proposed management activities.

#### Alternative 2, 3, and 4

No activities from the Sunflower Bacon project would occur within this geographical area. Both thinning and prescribed burning would occur to the north of the roadless area boundary. The sound of harvest activities may be heard from within the boundary but would not travel throughout the entire roadless area. During implementation of thinning activities users desiring solitude would have the opportunity to visit the eastern portion of the Skookum Roadless area or visit the ecologically similar Potamus Roadless Area 10 miles east of the Sunflower Bacon Project.

Smoke is likely to settle into the drainage bottoms in the evening and early morning following a prescribed burn. Smoke may have a negative impact to visibility and air quality for some users while others may enjoy the smell of a forest fire. This impact from burning would be temporary for a period of 2 days to a week depending on burning schedules and air patterns.

### *Cumulative Effects*

#### Alternative 2, 3, and 4

Grazing is permitted within this roadless area although cattle seldom enter the area due to the natural terrain barriers and strategically located fence structures that reduce access. Cattle and range management activities combined with sounds from harvest activities would further reduce the sense of solitude for any visitor occupying the area.

Although other prescribe burning projects are scheduled in the western portion of the Heppner Ranger District there would be no cumulative effect of smoke accumulation into the Skookum Roadless Area because the Ranger District does not have the workforce to prescribe burn several areas across the landscape at one time. There could be a cumulative effect over time if the Rimrock project area and the Sunflower Bacon project area prescribed burning continued for several years at the same time of the year; meaning that a visitor may experience smoke for several consecutive years if they were to visit the area during the burning seasons of spring and fall. Because burning conditions change annually it can not be determined exactly what day a future prescribed fire would occur.

## Other Areas without Roads

## Scope of the Analysis

Changes in natural integrity, apparent naturalness, solitude, remoteness, special features, and manageability, will be used to describe any potential effects proposed activities may have to the undeveloped areas within the project area. Natural integrity is the extent to which long-term ecological processes are intact and operating. Apparent naturalness is an indicator of whether an area appears natural to most people who are using the area. Solitude is defined as isolation from the sights, sounds, and presence of others and the development of man. Remoteness is the perceived condition of being secluded, inaccessible, and "out of the way". Special features are unique geological, biological, ecological, cultural, or scientific features located in the area. Manageability relates to the ability of the Forest Service to manage an area to meet the size criteria for wilderness consideration (at least 5,000 acres) and maintain the 5 elements listed above.

### *Current Condition*

The project area boundary is designated by the subwatershed boundary and does not indicate that activities or projects would occur on all lands. A portion of the Skookum Roadless area is within the watershed boundary but no activities or projects would occur within this area.

The presence of man is evident throughout the planning area. The natural integrity and apparent naturalness of the area is minimal due to past management activities. Nearly all of the forested areas have had at least one previous harvest. The indicators of past harvest include cut tree stumps, skid trails and most of the existing road system. Other man-made features include fences, man made ponds, dispersed camp sites and developed springs.

With the exception of the inventoried roadless area, all of the unroaded areas within the project area are irregular in shape; the most isolated portions of the areas are within one-half mile of an existing system road. Consequently there is currently little opportunity for either solitude (isolation from the sights, sounds, and presence of other and the development of man) or remoteness (the perceived condition of being secluded and inaccessible) within the undeveloped portions of the area. This area is not recognized as an area that the public uses for solitude or remoteness with the expectation of not seeing or interacting with others.

### *Direct and Indirect Effects*

#### Alternative 1

Alternative 1 is the No Action Alternative, thus no management actions would occur under Alternative 1. Therefore, there would be no effects to natural integrity, apparent naturalness, remoteness, solitude, special feature, and manageability to the areas without roads and their characteristics. Any changes to the areas would be through natural processes only.

### Alternative 2, 3, and 4

The site specific analyses for values of roadless areas are covered under each individual resource section of the EA and associated analysis file. The level of disturbance to soil, water and air are included in the specialist report for each resource and were found to be within forest plan standards and in compliance with local, state and federal regulations. All areas would remain forested after treatment although stand structure would change therefore the diversity of plant and animal communities may shift from current patterns but diversity would remain. The recreation opportunity spectrum for areas where treatment would occur is identified as Roaded Natural/Roaded Modified (Recreation Specialist Report). These recreation opportunity spectrum classifications would not change under any alternatives. The affects of the project to habitat and individual animal and plant species is included in the biological evaluations and specialist reports for each resource. The biological evaluations determined that this project would have no effect on most species and may impact individuals or habitat for the gray flycatcher and interior redband trout and may affect middle Columbia steelhead. The visual quality report did not identify any areas of high scenic quality. The forest archeologist did not find any activity effecting a traditional cultural properties or sacred site. This project would not develop any authorized roads. Temporary roads will be rehabilitated after project completion.

Effects of vegetation management activities on undeveloped characteristics would be short lived and include such activities as unit flagging, painted trees, and trees left with scars from logging such as where they were bumped by a felled tree or logging equipment. Other changes to the undeveloped characteristics from the vegetation management activities would be longer lived. The changes would include cut tree stumps, skid trails, and changes in the vegetative patterns.

The natural integrity and apparent naturalness of undeveloped areas will be only slightly reduced after harvest activities are completed because harvest activities will leave all areas fully stocked with trees of various sizes. Because temporary roads associated with harvest activities would be obliterated and revegetated following harvest no authorized roads from this project would remain after implementation. Most harvest is located on ridgetops or areas that are relatively flat and all harvest is adjacent to existing roads.

Within the harvest areas, the presence of man would be evident, but because of past harvest activity, the human induced change in the areas would be insignificant. Human activity in the areas is not expected to increase after harvest is complete.

The sights and sounds of logging would decrease the opportunities to experience solitude and recreationists seeking this type of experience would be likely to avoid the project area for the duration of the timber sale. However effects from harvest activity would be short duration; long term there would be little change from the exiting conditions.

No special features or unique characteristics were noted in any of the undeveloped areas. All undeveloped areas are considerably smaller than 5,000 acres and thus, do not meet the size criteria for wilderness designation. An area identified by a respondent suggested activities were planned in an unroaded area greater than 1000 acres. A portion of this area is within the project boundary and both prescribed burning and commercial thinning would occur. This area is irregularly shaped with classified system roads located within one-half mile of the most remote locations.

### Cumulative Effects

#### Alternative 1

There would be no cumulative effects to the undeveloped character of the areas with this alternative.

#### Alternative 2

As noted previously, various management activities have occurred in the undeveloped portions the planning area. Past timber harvest, grazing, all terrain vehicle use, and existing non-system roads have already impacted the areas. These activities are expected to continue. The area identified as greater than 1,000 acres includes ongoing and future activities including the Ant Timber Sale and prescribed burning; both projects were analyzed in the Rimrock Ecosystem Restoration Projects EIS.

The impacts of this project in addition to the existing condition and the reasonably foreseeable future projects will not exclude this area or any other areas from consideration for wilderness potential during forest plan revision because all areas have received harvest activities in the past, all areas will remain fully stocked after thinning and burning, the individual resource analysis found no significant effects of the project, and no new authorized roads would be developed.

The impacts of this project in addition to the existing condition and the reasonably foreseeable future projects will not exclude this area or any other areas from consideration for wilderness potential during forest plan revision because all areas have received harvest activities in the past, all areas will remain fully stocked after thinning and burning, the individual resource analysis found no significant effects of the project, and no new authorized roads would be developed.

## TREATY RIGHTS

The Forest Service, through the Secretary of Agriculture, is vested with statutory authority and responsibility for managing resources of the National Forests. Commensurate with this is the obligation to consult, cooperate, and coordinate with Indian Tribes in developing and planning management decisions regarding resources on National Forest System lands that may affect tribal rights. Elements of respective Indian cultures, such as tribal welfare, land, and resources were entrusted to the United States Government as a result of treaties. Because tribal trust activities often occur in common with the public, the Umatilla National Forest strives to manage ceded land in favor of the concerns of the respective tribes, as far as is practicable, while still providing goods and services to all people.

Locally, the Sunflower Bacon Project Area lies within traditional lands of the Confederated Tribes of the Umatilla Indian Reservation and the Confederated Tribes of the Warm Springs Indian Reservation. The area ceded to the United States Government as a result of the Treaty of 1855. Although the 1855 Treaties do not specifically mandate the federal government to manage habitats, there is an implied assumption that an adequate reserve of water be available for executing treaty-related hunting and fishing activities.

- Trust responsibilities resulting from the treaties dictate, in part, that the United States Government facilitate the execution of treaty rights and traditional cultural practices of the Confederated Tribes of the Warm Springs Indian Reservation and Confederated Tribes of the Umatilla Indian Reservation by working with them on a government to government basis in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the respective tribes or the federal government. As a result, Confederated

Tribes of the Warm Springs Indian Reservation and the Confederated Tribes of the Umatilla Indian Reservation were contacted via letter on March 15, 2005 to identify any concerns or alternatives they might have regarding the proposed action. No response was received.

### Environmental Consequences Common to All Action Alternatives

The potential effects of proposed timber harvest, thinning, and fuels treatments have are discussed under the Fish Habitat, Water, Wildlife, and Cultural Resources sections. In summary, none of the alternatives would adversely affect fish habitat, water or cultural resources due to project design, identified standard operating procedures, and Best Management Practices. Alternative 2 would result in greater long-term protection of big game habitat, due to a larger area treated, but there would also be a greater reduction in short-term habitat quality. Big game habitat would be affected to varying degrees under all action alternatives, although Alternative 3 would not reduce cover below the Forest Plan standards or further affect HEI in the C3 management area. Alternative 4 would provide for more long-term habitat protection than the No Action Alternative 1 and Alternative 3 by reducing the threat of severe wildfire and by improving growing conditions in the marginal cover but retaining the satisfactory cover. The big game populations have been declining for the last 2 years, but the Oregon Department of Fish and Wildlife has reduced the number of tags available so exercise of hunting rights should not be affected. See respective sections for a more thorough discussion of effects on water, fish habitat, and wildlife.

## *ECONOMIC*

This section incorporates by reference the Sunflower Bacon Economic Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and a summary of the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

### Scope of the Analysis

This report will analyze the direct revenues and expenses associated with the Sunflower Bacon project activities. Based on those direct revenues and expenses, this report will provide an assessment of the viability of the proposed timber harvest and a financial efficiency analysis. Other environmental factors such as water quality, fish, wildlife, soil productivity, etc. have value that can be expressed in economic or non-economic terms. However, those other environmental factors do not have financial benefits and costs that are identifiable and quantifiable with relationship to the activities proposed for Sunflower Bacon. Since those benefits and costs do not have identifiable and quantifiable relationships to the proposed activities, an analysis would not show any financial or economic difference in those factors between alternatives. Therefore, economic analysis of those other environmental factors will not be included in this report.

### Current Condition

The affected area, or economic impact zone, for the Sunflower Bacon project includes Morrow, Grant, Wheeler, and Umatilla counties in Oregon. Economic profiles have been developed for Morrow, Grant, Wheeler, and Umatilla counties and are available at the Heppner Ranger District. The profiles summarize demographic, employment, and income trends in those counties. Refer to the Umatilla National Forest, Land and Resource Management Plan, Final Environmental Impact Statement,

Appendix B, for additional detailed description of the main social and economic characteristics of the area (USDA 1990).

# Timber Sale Viability

## Direct and Indirect Effects

### Alternative 1

Alternative 1 does not include any timber harvest proposal; therefore, timber harvest viability is not applicable

### Alternative 2

Table E-1 displays predicted bid rate for Alternative 2 compared to the other action alternatives. Alternative 2 has the highest predicted bid rate. That would indicate the proposed timber harvest is viable and that Alternative 2 has the greatest potential of the action alternatives to remain viable in the event of decreases in timber values or increases in harvest costs.

Table E-1. Predicted bid rate of action alternatives

| | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| | $/ccf | $/ccf | $/ccf |
| Predicted Bid Rate | 55.52 | 51.19 | 54.28 |

### Alternative 3

Table E-1 displays the predicted bid rate for Alternative 3 compared to the other action alternatives. Alternative 3 has a positive predicted bid rate. That would indicate the proposed timber harvest is viable. However, Alternative 3 has the lowest predicted bid rate and would be most at risk of the action alternatives to lose viability in the event of decreases in timber values or increases in harvest costs.

### Alternative 4

Table E-1 displays the predicted bid rate for Alternative 4 compared to the other action alternatives. Alternative 4 has a predicted bid rate intermediate between alternatives 2 and 3. Alternative 4 has a positive predicted bid rate. That would indicate the proposed timber harvest is viable. Alternative 4 has less potential than Alternative 2 and greater potential than alternative 3 to remain viable in the event of decreases in timber values or increases in harvest costs.

## Cumulative Effects

### Past Activities

Past timber harvest activities on all ownerships within the local area have affected the viability of timber harvest to the extent that the present industrial infrastructure and workforce have developed as a result of the past activities. The effects of specific activities on the viability of timber harvest are not measurable.

### Present and Reasonably Foreseeable Activities

Estimates for predicted bid rates for the proposed action and alternatives are within the range of rates experienced by the three Blue Mountain forests (Malheur, Umatilla, and Wallowa-Whitman) within the last two years. Because of the competitiveness of the market, and its global nature, none of the alternatives would in themselves affect prices, costs, or harvest viability of other present or reasonably foreseeable timber sales in the area.

## Financial Efficiency

### *Direct and Indirect Effects*

#### Alternative 1

Alternative 1 does not include any activities with an associated revenue or cost. Therefore, the revenue/cost ratio is not applicable and the net present value is $0.

#### Alternative 2

Table E-2 displays the revenue/cost ratio and present net value (PNV) for each action alternative. Alternative 2 has the highest revenue/cost ratio and the greatest PNV, indicating that this alternative is the most financially efficient of the action alternatives. The positive PNV for the timber sale alone indicates that funds would likely be available for implementation of some of the other resource projects through the Knutsen-Vandenburg (KV) plan for the sale. The negative PNV for the timber sale and other activities combined indicates that the total cost of all activities would exceed the revenue to the Forest Service from the timber sale.

Table E-2. Financial efficiency of action alternatives.

| | Alternative 2 | | Alternative 3 | | Alternative 4 | |
|---|---|---|---|---|---|---|
| | R/C | PNV | R/C | PNV | R/C | PNV |
| Timber Sale1 | 1.63 | $278,650 | 1.50 | $137,023 | 1.59 | $223,853 |
| Timber Sale and other proposed activities2 | .57 | ($551,151) | .37 | ($692,778) | .50 | ($605,949) |
| *1 Values calculated based on predicted stumpage value of timber sale, and cost to the Forest Service to prepare and administer the timber sale contract. Costs to the timber sale purchaser of accomplishing environmental protection measures are included in the calculation of the predicted bid rate.* | | | | | | |
| *2 Includes all timber sale costs described above, plus cost to the Forest Service to prepare and implement prescribed burning, noncommercial thinning, and noxious weed control.* | | | | | | |

#### Alternative 3

Table E-2 displays the revenue/cost ratio and present net value for each action alternative. Alternative 3 has the lowest revenue/cost ratio and the lowest PNV, indicating that this alternative is the least financially efficient of the action alternatives. The positive PNV for the timber sale alone indicates that funds would likely be available for some of the other resource projects through the KV plan for the sale, although the amount would be less than for alternatives 2 and 4. The negative PNV for the timber sale and other activities combined indicates that the total cost of all activities would exceed the revenue to the Forest Service from the timber sale.

#### Alternative 4

Table E-2 displays the revenue/cost ratio and present net value for each action alternative. Alternative 4 has a revenue/cost ratio and PNV between that of alternatives 2 and 3, indicating that this alternative is intermediate between the other two in terms of financial efficiency. The positive PNV for the timber sale alone indicates that funds would likely be available for some of the other resource projects through the KV plan for the sale. The negative PNV for the timber sale and other activities combined indicates that the total cost of all activities would exceed the revenue to the Forest Service from the timber sale.

### *Cumulative Effects*

#### Past Activities

The financial efficiency of past projects would not affect the financial efficiency of the Sunflower Bacon project or other present or reasonably foreseeable activities.

#### Present and Reasonably Foreseeable Activities

Other present or reasonably foreseeable projects would not affect the financial efficiency of the Sunflower Bacon project or other present or reasonably foreseeable activities.

# *COMPLIANCE WITH OTHER LAWS, REGULATIONS, AND POLICIES*

This section describes how the action alternatives comply with applicable State and Federal laws, regulations, and policies.

## National Historic Preservation Act

This section incorporates by reference the Sunflower Bacon Heritage Report contained in the project analysis file at the Heppner Ranger District.

Before project implemental, State Historic Preservation Office consultation would be completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated March 10, 1995.

Identified sites will be protected from all project activities associated with the Sunflower Bacon Timber Sale project. Should additional sites be found during ground disturbing activities, contract provisions would provide protection and the Zone Archaeologist would be immediately notified.

## Endangered Species Act and Regional Forester's Sensitive Species

The Endangered Species Act requires protection of all species listed as "threatened" or "endangered" by federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). Biological Evaluations for "Endangered", "Threatened", and "Sensitive" plant, wildlife, and fish species have been completed. Determinations were made that none of the proposed projects would adversely affect, contribute to a trend toward Federal listing, nor cause a loss of viability to the listed plant and animal populations or species.

Details regarding the actual species found within the Sunflower Bacon analysis area and the potential effects of proposed activities on those species and their habitat are contained under the Wildlife Habitat;

Aquatic; and Non-Forest Vegetation: Proposed, Endangered, Threatened, and Sensitive plant species sections of this EA.

## Inventoried Roadless Areas, Wilderness, and Wild and Scenic Rivers

Part of the Skookum Roadless Area (1,619 acres) lies in the southeast corner of the Sunflower Bacon project area. No thinning or prescribed burning is proposed in this project within the Skookum Roadless Area. There is no wilderness within the project area. There are no wild and scenic rivers within the project area.

## Clean Water Act

This section incorporates by reference the Sunflower Bacon Water Resources Report contained in the project analysis file at the Heppner Ranger District.

Roads and timber management activities have been identified as contributing to non-point sources of pollution in the Sunflower Bacon project area. The strategy to protect water from non-point source pollution includes implementation of Best Management Practices, Project Design Criteria, and monitoring for detection and validation of water quality concerns. The Forest Plan states that the Forest would implement Best Management Practices to meet water quality standards.

Best Management Practices (BMPs) are steps taken in project planning as well as on-the-ground mitigations which protect water quality. The actions proposed for this project were designed during planning to protect water quality. For example, the design includes no harvest and no ignition in riparian areas. Temporary roads are proposed in riparian areas only when necessary to reach specific units. Actions in riparian areas have site-specific mitigations to insure that water quality is not compromised. There is a list of Best Management Practices in Appendix A.

Project design elements are practices that the interdisciplinary team developed during this analysis to address site-specific environmental concerns that were not sufficiently addressed by existing management requirements. Examples of project design elements are: A) No hauling over open water fords unless dry; or B) Heavy equipment would not operate when soil is wet enough to be damaged by such operation. Damage refers to effects to roads which would not be repaired by normal blading. Damage also refers to environmental effects which would limit the beneficial use of any water body.

The designated beneficial uses for the Sunflower Bacon analysis area, as defined by the State of Oregon for the John Day River Basin are:

| | |
|---|---|
| Public Domestic Water Supply | Anadromous Fish Passage |
| Private Domestic Water Supply | Salmonid Fish Rearing |
| Industrial Water Supply | Salmonid Fish Spawning |
| Irrigation | Resident Fish and Aquatic Life |
| Livestock Watering | Wildlife and Hunting |
| Boating | Fishing |
| Aesthetic Quality | Water Contact Recreation |

The beneficial uses which may be affected by timber harvest, road building, and prescribed burning are salmonid fish rearing, salmonid fish spawning, and resident fish and aquatic life.

## 303(d) listed Streams

Section 303 of the Clean Water Act requires the states to list the streams whose use is impaired because they do not meet water quality standards. The water quality standards which may be affected by timber harvest, road building, and prescribed burning are stream temperature because of reduced shade in riparian areas and sediment and turbidity from altered stream banks.

There are no Sunflower Bacon analysis area streams on the 303(d) list.

The practices that the Forest Service uses to insure that there would be no degradation to streams are detailed in the Best Management Practices.

## Clean Air Act

This section incorporates by reference the Sunflower Bacon Air Quality Report contained in the project analysis file at the Heppner Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

The airshed over and around the Sunflower Bacon analysis area currently meets air quality standards for Class II Airsheds (Oregon Smoke Management Annual Report, 2001). The closest Class I Airshed-designated Wilderness Areas are the Strawberry Mountain Wilderness, approximately 65 air miles away, near John Day, Oregon, and the Eagle Cap Wilderness about 110 air miles away, east of La Grande, Oregon. Due to these distances and prevailing wind patterns, smoke intrusion into these areas is not likely.

All action alternatives would have a prescribed fire component that would create emissions. The emissions created could have an effect on public health. To minimize emissions, prescribed burning would take place under conditions favorable to effective mixing and dispersal of the smoke created to the greatest extent possible. Also, the treatments under each alternative would remove some of the fuels that would otherwise produce particulates, or would rearrange fuels so that they burn cleaner. The effects associated with prescribed burning would be of short duration and have little impact on surrounding communities and Class I Airsheds due to the remoteness of the project area from those areas.

Any prescribed burning operations within the project areas would comply with the State of Oregon's Smoke Management Implementation Plan, and would be implemented within guidelines of the Smoke Management Program. The State would implement restrictions on burning when wind predictions indicate smoke could be carried into sensitive areas. A listing of additional requirements is available in the Oregon Smoke Management Plan. In conclusion, this project would comply with the requirements of the Clean Air Act and be conducted in accordance with the operational guidelines agreed to by the Forest Service and the Oregon Department of Environmental Quality.

## Water Rights and Use

This section incorporates by reference the Sunflower Bacon Vegetative Management Range Report contained in the project analysis file at the Heppner Ranger District.

A total of 95 ponds and 7 spring developments have been constructed on the Little Wall Creek Allotment. A total of 49 ponds and 15 springs have been constructed on the Hardman Allotment. These ponds and troughs were constructed and/or used to help improve livestock distribution within pastures reducing the concentration of livestock. Water use of ponds associated with live stream channels are under permit by the Oregon State Water Resources Department.

There is no de-facto or designated domestic or municipal water supplies in the Sunflower Bacon project area.

## Executive Order 13186: Neotropical Migratory Birds

This section incorporates by reference the Sunflower Bacon Terrestrial Wildlife Report and Biological Evaluation contained in the project analysis file at the Heppner Ranger District.

The Partners in Flight Bird Conservation Plan is used to address the requirements contained in Executive Order (EO) 13186 (January 10, 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*. Under Section 3(E) (6), through the National Environmental Policy Act, the Executive Order requires that agencies evaluate the effects of proposed actions on migratory birds, especially species of concern. Partners in Flight Conservation Planning allows the analysis of effects of proposed projects on neotropical migratory birds through the use of guidelines for priority habitats and bird species of concern for each planning unit. The conservation strategy does not directly address all landbirds species of concern, but instead uses “focal” species as indicators to describe the conservation objectives, and measures project effects in different “priority” habitats for the avian communities found in the planning unit. The Umatilla National Forest occurs in the Northern Rocky Mountain Landbird Conservation Planning Region, which includes the Blue Mountains sub-region and the Blue Mountains sub-province. Conservation planning for the Blue Mountains, Ochoco Mountains, and Wallowa Mountains sub-provinces is addressed in the *Conservation Strategy for Landbirds* in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000).

Activities under all action alternatives would be designed using the above strategy, and therefore would be consistent with Executive Order 13186. See the Neotropical Migratory Birds section for further discussion of effects on Neotropical migratory birds.

## Executive Orders 11988 and 11990: Floodplains and Wetlands

This section incorporates by reference the Sunflower Bacon Water Resources Report contained in the project analysis file at the Heppner Ranger District.

Executive Order (EO) 11988 requires the Forest Service to avoid “to the extent possible the long and short term adverse impacts associated with the ... occupation ... or modification of floodplains...” The Sunflower Bacon Project is consistent with this EO because it does not propose to occupy or modify any floodplain.

Executive Order (EO) 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the ... destruction or modification of wetlands." The Sunflower Bacon Project is consistent with this EO because it does not propose to destroy or modify any wetland.

## Executive Order 12898: Environmental Justice

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of the Proposed Action or any of its alternatives there would be no disproportionately high and 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, thinning, fuels treatment, and burning activities. Racial and cultural minority groups could also be prevalent in the work forces that implement prescribed fire or thinning activities. Contracts contain clauses that address worker safety.

## National Forest Management Act

The Sunflower Bacon project is consistent with the National Forest Management Act (NFMA) (36 CFR 219.8(e)).

1. All proposed commercial and noncommercial units are planned on suitable land where soil, slope, or other watershed conditions would not be irreversibly damaged (soil and hydrology report). Mitigation has been identified to protect site productivity, soils, and water quality.

2. All areas thinned will be adequately stocked after treatment is complete. No clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an even-aged stand of timber harvest would occur (FSM 1921.12g).

3. Streams, streambanks, wetlands, and other bodies of water are protected from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment where harvests are likely to seriously and adversely affect water conditions or fish habitat. Project Design Elements and Best Management Practices have been identified that would protect water resources.

4. The harvesting systems selected were based on soil type, slope, and the size of material to be removed.

Proposed activities are designed to accelerate development of forest habitats that are currently deficient within the analysis area, enhancing the diversity of plant and animal communities in the long-term. See discussions under the applicable resource sections below for further support that proposed activities would comply with the National Forest Management Act and the four requirements associated with vegetation management (FSM 1921.12a).

## Forest Plan Consistency

The Umatilla National Forest produced the Forest Plan in accordance with the National Forest Management Act of 1976. This plan provides guidelines for all natural resource management activities and establishes management standards.

### *Forest Vegetation*

The Umatilla National Forest produced the Forest Plan in accordance with the National Forest Management Act of 1976. This plan provides guidelines for all natural resource management activities and establishes management standards.

The vegetative manipulation (commercial and non-commercial thinning) associated with the Sunflower Bacon project is consistent with the Umatilla National Forest Land and Resource Management Plan FEIS and Record of Decision (see Forest Vegetation Report for details).

Regional Forester's Forest Plan Amendment #2 (Eastside Screens) incorporated additional wildlife habitat measures. To address this amendment, patterns of stand structure by biophysical environment have been compared to the Historic Range of Variability (HRV) for the analysis area. The amount and distribution of dry forest in the Old Forest Single Stratum structural stage is currently deficit as compared the historic range of variability. Late and old structural stage stands would be maintained and enhanced as a result of planned activities in the analysis area. No green trees greater than or equal to 21 inches diameter at breast height would be removed by timber harvest. Stands would be thinned to move their condition towards an Old Forest condition. Harvest of diseased or insect/dwarf mistletoe-infested trees and other fuel reductions would also indirectly aid achievement of Historic Range of Variability for vegetation structure and species composition by reducing future fire intensities within the treated areas. Connectivity would be maintained between Late Old Structure stands; snags, green tree replacements, and down logs would be maintained as recommended in the Sunflower Bacon Wildlife Specialists Report and Biological Evaluation.

The non-commercial thinning, commercial thinning, salvage, and prescribed burning included in alternatives 2, 3, and 4 would not create any new forest openings. Uneven-aged management would be used in the commercial thinning units. Burning would be of low intensity where fuel levels are appropriate that newly created openings would not occur.

### *Fire/Fuels*

Current Forest Plan direction identifies fuel standards by management area across the forest. Proposed activities would increase treated units toward the Forest Plan standard of an average of 9 to 12 tons per acre in the 0-3-inch size class (depending on management area). Proposed harvest treatments will increase fuel loading in the short term and may exceed standards on some acres. All harvest treatment areas are planned for prescribed fire treatments which will reduce fuel loading to within standards identified in the forest plan.

The actions and treatments proposed in this project tier to and would successfully implement the Forest Pan Standards and Guidelines for fuels management.

Refer to the fisheries report for PacFish requirements for prescribed burning and mitigation measures.

### *Wildlife Habitat*

These activities meet the specifications described in the Forest Plan Amendment #11 (Eastside Screens) and are, thereby, exempt from the interim ecosystem standard. However, they must meet the interim wildlife standard, which contains two scenarios, and it was decided to meet the more restrictive of the two – Scenario A. Therefore, the treatment proposals would be consistent with items 1 through 5 of Scenario A (See Appendix D – Screens).

The Forest Plan standards and guidelines for C3 – Big Game Winter Range require the management of elk habitat to achieve a habitat effectiveness index of no less than 70. Due to the site capability and its influence on the potential to attain a habitat effectiveness index consistent with the forest plan the existing condition within the Big Game Winter Range yields a habitat effectiveness index of only 69. Although the action alternatives would result in no change to the habitat effectiveness index, alternatives 2 and 4 include a Forest Plan amendment. However, proposed activities would increase the amount of forage in the near future and forest canopy in the long-term, so this index would improve over time.

Goshawk surveys completed in June 2005 found no evidence of Goshawks in the analysis area.

### *Soils*

All alternatives would be consistent with Forest Plan standards and guidelines for achieving soil quality maintenance objectives. One unit proposed in this project has existing detrimental soil conditions which exceeds the Forest Plan Standard. The proposed activities would increase detrimental soil condition above the Forest Plan standard in 11, 6, or 10 additional units, depending on alternative. All of the areas with detrimental soil condition above the Forest Plan standard would be rehabilitated after harvest to an acceptable condition. Because the land would be left in a condition of acceptable productivity, these alternatives comply with the 1990 Forest Plan requirements for Soil Productivity.

### *Water*

All alternatives in this project comply with the Clean Water Act standard of maintaining water quality.

In accordance with the 1990 Forest Plan, the Sunflower Bacon Project uses planning and application Best Management Practices (BMPs) to maintain and improve water quality, and includes monitoring of BMP implementation and effectiveness. Results of BMP monitoring have allowed managers to adapt to watershed conditions. Recent monitoring shows that BMPs are being implemented and that they are effective at maintaining water quality in timber harvest areas.

Improvements in riparian conditions in timber sale areas result from using planning and application BMPs, and monitoring to see that BMPs are implemented and that they are effective. Because of using planning and application BMPs, and monitoring the implementation and effectiveness of the BMPs, the Sunflower Bacon Project is in accordance with the Clean Water Act and complies with the Clean Water Act requirements of the 1990 Forest Plan.

### *Aquatic – Fish Habitat*

The Umatilla Forest Plan was amended in 1995 to incorporate PACFISH. PACFISH defines Riparian Habitat Conservation Areas surrounding streams and other riparian features, and identifies associated Riparian Management Objectives. Within the Sunflower Bacon analysis area, Riparian Habitat Conservation Area boundaries extend 300 feet from fish bearing streams, 150 feet from perennial, non-fish bearing streams, and 150 feet from wetlands larger than one acre, and 100 feet from intermittent streams or wetlands smaller than one acre.

These alternatives are consistent with Forest Plan direction regarding fish. None of the potential combined effects are expected to adversely affect PacFish Riparian Management Objectives or steelhead or redband trout population viability. Application of PacFish direction would maintain or improve fish habitat conditions in the analysis area.

These alternatives are also consistent with the Basin wide Salmon Recovery Strategy (All-H Strategy), as it requires following existing management direction in the short-term and following ICBEMP science in the long-term. These alternatives are also consistent with *Wy-Kan-Ush-Mi Wy-Kish-Wit* --- The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes. This restoration plan recommends that federal agencies follow existing land use and water quality laws and regulations – this would include PacFish.

Falling of hazard trees, skidding or forwarding of wood across two class four tributaries from unit 66, removal of conifer trees from aspen unit 18 and prescribed burning may occur within Riparian Habitat Conservation Areas. These activities are designed to comply with PACFISH Riparian Management Objectives. The project is consistent with the Forest Plan for water resources and riparian management.

### Cultural Resources

Completed surveys followed the Umatilla National Forest Inventory strategy and can be accurately replicated from report maps and descriptions. Before project implementation, State Historic Preservation Office consultation would be completed under the programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated March 10, 1995.

Identified sites would be protected from all project activities associated with the Sunflower Bacon project. Should additional sites be found during ground disturbing activities, contract provisions would provide protection and the Forest Archaeologist would be immediately notified.

### Noxious Weeds

The Sunflower Bacon Vegetation Management Project is consistent with the Umatilla Land and Resource Management Plan direction, as amended, with respect to noxious weeds. Compliance with Prevention Standards and Forest Plan Goals and Objectives would be implemented to address noxious weeds (Regional Noxious Weed EIS October 2005).

The pertinent new standards that pertain to the Sunflower Bacon Project are identified in Appendix A. of Sunflower Bacon Vegetative Management Noxious Weeds Report. Umatilla Forest Plan Goals and objectives, as amended are identified in the prevention standards in Pacific Northwest Invasive Plant Program Final Environmental Impact Statement, Record of Decision.

## Other Jurisdictions

There are a number of other agencies responsible for management of resources within the Sunflower Bacon analysis area. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife has been contacted regarding this analysis.

The Environmental Protection Agency is responsible for enforcement of environmental quality standards, such as those established for water resources, while the Oregon Department of Environmental Quality sets standards, identifies non-point sources of water pollution, and determines which waters do not meet the goals of the Clean Water Act. The Environmental Protection Agency has certified the Oregon Forest Practices Act as Best Management Practices. Oregon State compared Forest Service practices used to control or prevent non-point sources of water pollution with the Oregon Forest Practices Act and concluded that Forest Service practices meet or exceed State requirements. These are periodically reviewed as practices change. The Forest Service and Oregon Department of Environmental Quality have signed a Memorandum of Understanding (2/12/79 and 12/7/82) outlining this.

Oregon Department of Environmental Quality and the Oregon Department of Forestry are responsible for regulating all prescribed burning operations. The USDA Forest Service Region 6 has a Memorandum of Understanding with Oregon Department of Environmental Quality, Oregon Department of Forestry, and the USDI Bureau of Land Management regarding limits on emissions, as well as reporting procedures. All burning would comply with the State of Oregon's Smoke Management Implementation Plan and, for greater specificity, the memorandum of understanding mentioned above.

Before project implementation, State Historic Preservation Office consultation would be completed under the Programmatic Agreement dated March 10, 1995.

## Energy Requirements and Conservation Potential

Some form of energy would be necessary for proposed projects requiring use of mechanized equipment:  Non-commercial thinning would involve small machines, while projects such as road repair could require heavy machinery for a small amount of time.  Both possibilities would result in minor energy requirements.  Alternatives that harvest trees would create supplies of firewood or hog fuel as a by-product, which would contribute to the local supply of energy for home space heating or electricity production.

## Prime Farmland, Rangeland, and Forestland

No prime farmland, rangeland, or forestland occurs within the analysis area.

## Consumers, Minority Groups, and Women

Effects on civil rights, including those of minorities and women, would be minimal.  Activities associated with the action alternatives would be governed by Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc.  Such contracts also contain nondiscrimination requirements.  While the activities identified here would create jobs and the timber harvest would provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, and women.

## Unavoidable Adverse Effects

Implementation of any of the alternatives, including the No Action alternative, would inevitably result in some adverse environmental effects.  The severity of the effects would be minimized by adhering to the direction in the management prescriptions and Standards and Guidelines in Chapter IV of the Forest Plan and additional mitigation proposed in Chapter 2 of this document.  These adverse environmental effects are discussed at length under each resource section.

## Short-term Use and Long-term Productivity

Short-term uses are generally those that determine the present quality of life for the public.  In the Pacific Northwest, this typically includes:  timber harvest, livestock grazing, recreation, transportation, utility corridors, and wildlife habitat.  Long-term productivity refers to the land's capability to support sound ecosystems producing a continuous supply of resources and values for future generations.

### Alternative 1 – Environmental Consequences

There would be no change in short-term uses within the analysis area.  However, there would be a risk of reducing long-term productivity because trees in densely stocked stands would experience increasing stress as they grow and would become more susceptible to insect infestation and disease.  Fuels would also continue to accumulate, risking a loss of long-term productivity due to increase wildfire severity.

### Alternatives 2, 3, and 4 – Environmental Consequences

Management activities associated with short-term uses (i.e. burning, use of machinery, or removal of wood fiber) could reduce the productivity of some portions of the Sunflower Bacon analysis area. Conclusive evidence relative to short-term impacts of timber harvest and prescribed fire adversely affecting long-term site productivity does not exist.  However, nitrogen reserves, organic residues, and soil physical properties are critical elements of the ecosystem that must be carefully managed to ensure long-term productivity.

For purposes of this analysis, the duration of this project would be at least five years.  Under all action alternatives, the long-term productivity of the National Forest System lands and resources would be protected from unacceptable degradation by the standards and guidelines in the Forest Plan, specific project design elements, and mitigation measures for the alternatives described in Chapter 2 of this document.

Structural improvements contribute towards the opportunity to use the potential productivity of the analysis area.  Roads and trails provide necessary access, and roads are considered as long-term improvements that provide for continued use over time.  No new construction would occur, although 8 miles of road would be reconstructed and 33 miles of maintenance for each of the action alternatives. Proposed maintenance and reconstruction of open roads would improve accessibility for the public, and on closed roads would amend drainage and erosion concerns.  Animals that use roads or OHV trails open to the public are at risk of hunting, harassment, and injury or death by vehicular collision during their life cycle.  Proposed thinning along roads could modify future use by animals, particularly relating to big game during hunting seasons.  In noncommercial thinning stands, leaving a 10 to 15 foot strip of regeneration along open and seasonally open roads would aid in reducing big game vulnerability by limiting sight distance.

Late/Old structure, particularly Old Forest Single Stratum, has been greatly diminished within the analysis area.  Proposed thinning would accelerate development of these habitats within treated stands, shortening the time that dependent wildlife species are extirpated from the area or are stressed due to less ideal habitats.  Treatments would transform some of the multi-layer old forest into single-layer old forest.  Stress on trees would also be reduced in treated stands, reducing the incidence of insects and disease and improving growth and productivity of remaining trees.

Treatment of insect and disease damaged stands by removing susceptible tree species would improve the long-term forest productivity of affected areas and reduce the risk of spread to adjacent stands.

No long-term effects to water or its beneficial uses are expected from the proposed management activities under any alternative.

Effective fire prevention and suppression, while minimizing damage to existing timber stands and other resources, resulted in long-term changes in vegetative composition and reduced timber productivity, altering the overall ecosystem.  Removal of wood fiber and disposal of slash, if done through a proper prescription, would have little effect on long-term site productivity.  However, productivity could be adversely affected if large wood is not removed, or slash resulting from harvest is not treated or is inadequately treated.  Burning at the wrong time or allowing for a high intensity, long duration fire would result in loss of soil fertility.  Most other effects of slash disposal would be short-term and have little effect on productivity.

Harvest, thinning, and prescribed fire can be utilized both effectively and efficiently to reduce fuel loadings and otherwise manipulate the various fuel complexes in the analysis area.  This would greatly reduce the consequences of a wildfire within and adjacent to the manipulated fuels complexes.  It would also enhance the long-term productivity of wildlife habitat, increase stream flows, provide more visual diversity, and provide the disturbance necessary for the perpetuation of important plant species.  The temporary impacts of smoke from prescribed fire under the action alternatives would have minor effects on the short-term use of Forest resources such as recreation sites and visual resources. The use of prescribed fire to reduce the flammability of activity fuels would affect long-term forest productivity by reducing the risks and consequences of a major wildfire. The long-term benefits of prescribed fire in natural fuels more than outweigh the short-term impact to air quality.

## Irreversible and Irretrievable Effects

An **Irreversible** commitment of resources refers to a loss of future options with nonrenewable resources. An **Irretrievable** commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

No new construction of permanent roads is planned. Rock used to surface roads would be an irreversible commitment of mineral resources.

The soil and water protection measures identified in the Forest Plan Standards and Guidelines, design criteria elements procedures in Chapter 2, and Best Management Practices in Appendix A are designed to avoid or minimize the potential for irreversible losses from the proposed management practices.

Concerning threatened and endangered plant, wildlife, and fish species, a determination has been made that the proposed actions would not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives.

### Environmental Consequences Unique to No Action

There would be an irretrievable loss of growth within the untreated forest. Potentially, the ability to protect forest within the analysis area from catastrophic fire could be irretrievably lost, as well.

There would be an irreversible loss of timber value due to poor tree growth related to crowded conditions and insects and disease. With only small remnant stands of aspen currently left, any more loss of this unique habitat could cause irreversible loss of the species from the analysis area.

### Environmental Consequences Common to All Action Alternatives

Tree removal would result in an irretrievable loss of the value of removed trees for wildlife habitat, soil productivity, and other values. Log landings would produce irreversible changes in the natural appearance of the landscape. The visual effect of log landings would be reduced by project design elements to reduce soil compaction and erosion (i.e. seeding). Little irreversible loss of soil should occur due to extensive mitigation associated with timber harvest and prescribed fire (project design elements in Chapter 2).

There would be an irretrievable loss of growth and fuels reduction within untreated forests outside of treatment units.

# Chapter 4 Consultation and Coordination

## *Scoping and 30-day Comment Period*

Scoping letters were sent to the mail list of interested parties maintained at the Umatilla National Forest Supervisor's Office. This included the Confederated Tribes of the Warm Springs Reservation of Oregon, The confederated Tribes of the Umatilla Indian Reservation, and Oregon Department of Fish and Wildlife. Two environmental interest groups (Oregon Natural Resources Council and League of Wilderness Defenders - Blue Mountain Biodiversity Project) and one State Agency (Oregon Department of Fish and Wildlife) responded to scoping, and submitted comments regarding this project. Copies of this Environmental Assessment (April 2006) was provided to these groups or organizations. The following lists of individuals, organizations, and government agencies that received scoping letters were notified of the availability of this Environmental Assessment for a 30-day public review.

Three letters were received in response to the 30 day comment period: Steve Cherry of the Oregon Department of Fish and Wildlife, Asante Riverwind incorporating comments from both Blue Mountains Biodiversity Project and Sierra Club Juniper Group, and Doug Heinkin of Oregon Natural Resources Council. The individual or groups that responded to either the scoping or 30 day comment period will be mailed a copy of the final Sunflower Bacon Environmental Assessment and the Decision Notice and FONSI. All others on the mailing list will be notified of the decision and availability of the final EA. Request for copies of the EA or decision notice can be obtained by contacting the Heppner Ranger District office.

## *Tribes*

### Confederated Tribes of the Umatilla Indian Reservation

Antone Minthorn – Chairman
Cary Miller – Cultural Resources Protection Program
Eric Quaempts – Director, Department of Natural Resources
John Barkley – General Council Chairman
Rick George – Environmental Plan. Rights Protect Department
Carl Scheeler – Wildlife Program Director
Gary James – Fisheries Program Director
Teara Farrow – Cultural Resources Protection Program

### Confederated Tribes of the Warm Springs Indian Reservation

Ron Suppah – Chairman
Scott Turo – Off Reservation Habitat Biologists
Delvis Heath, Sr.
Nelson Wallulatum
Joseph Moses
Sally Bird – Program Manager, Cultural Resources Department
Bobby Brunoe – Natural Resources

### Nimiipuu Tribe

Anthony Johnson – Chairman
Allen Slickpoo Jr. – Chairman, Natural Resources Subcommittee
Ira Jones – Watershed Management
Aaron Miles – Natural Resources.

Dave Johnson – Fisheries
Rich Eichstaedt – Office of Legal Council

## Government Agencies

### Bureau of Indian Affairs
Jerry Lauer

### Cooperative extension service
Randy Mills, Extension Agent Umatilla County
Walter Gary, Extension Agent Walla Walla County

### Grant County
Soil and Water District

### Oregon Department of Fish & Wildlife
Tim Unterwegner
Kevin Blakely
Tim Bailey
Habitat Conservation Division
Russ Morgan
Steve Cherry

### Oregon Department of Environmental Quality

### Oregon Department of Forestry
David Morman
John Buckman

### Oregon Division of State Lands
Fern Shank

### National Marian Fisheries Service
Protect Species Program, Northwest Region
Randy Tweten
Michael Tehan, Oregon State Habitat Office Director
D. Robert Lohn, Regional Administrator

### Umatilla Basin Watershed Council
Tracy Bosen

### Umatilla County
Tom Johnson – Watermaster, District 5
Matt Voile – Weed Control

### U.S. Environmental Protection Agency, Region 10
Denise Clark
Environmental Rev. Coordinator

### U. S. Fish & Wildlife Service
John Kinney
Portland Field Office Field Supervisor

## Universities

University of Oregon – Student Director, Environmental Studies Center
Western Washington University – Robert Lopresti, Documents Department, Wilson Library

## Industry

Associated Oregon Loggers, Inc.
Blue Mountain Lumber Products – Bill Cameron
Blue Mountain Natural Resource Foundation
Boise Cascade Corporation – Tony Steenkolk, John Warness
Henderson Logging Inc. – James E. Henderson
Joe Cook Logging
Kinzua Resources LLC – Bob Broden / Andy Munsey
KLE Enterprises Inc. – Ken Evans
Oregon Log and Fiber – Tim Always
Pine Creek logging – Don Barnett
Three Valleys Ranch Fossil Property – John Aaron

## Organizations

Adopt-A-Forest – Judith Johnson
Alliance for the Wild Rockies – Ecosystem Defense
American Forest Resource Council – Chuck Burley
Blue Mountains Biodiversity Project – Karen Coulter
Columbia River Inter-Tribal Fish Commission – Jim Weber
Desert Rats – Brigit Mudd
East Oregonian – Barry Rockford
Forest Conservation Council – Western Regional Office
Forest Recovery Inc.
Forest Service Employees for Environmental Ethics – Forest Fleischman, Policy Advocate
Greystone – Amber Martin
Hells Canyon Preservation Council – Greg Dyson
Inland Northwest Wildlife Council – Robert D. Panther, Executive Director
Natural Resources Research Library – S.J. and Jessie E. Quinney
Oregon Natural Desert Association – Peter M. Lacy
Oregon Natural Resources Council – Tim Lillebo, Chandra LeGue, Doug Heinkin
Oregon Trout – Jim Myron
Pacific Rivers Council – Ken Rose / Mary Scurlock
Pendleton Record
Rocky Mountain Elk Foundation – Rance Block
Sierra Club Juniper Group – John E. Barry, Asante Riverwind
Sierra Club, Inland Northwest Office – Chase C. Davis
The Lands Council – Mike Petersen
Wilderness Society – Bob Friemark
Wildlife Management Institute – Robert P. Davison, NW Field Rep

## Individuals

| | | |
|---|---|---|
| Chris Burford | M. Sharp | J.V. Lundsten |
| Loren Clark | Callie Staver | Ralph Miller |
| Howard Bryant | Don Stroeber | Roger Neufeldt |
| James P. Bailey | Ray French | Dean North |
| Don Bennett | Jon M. Huwe | Tom Penner |
| David Bishop | Richard N. Isaacson | Lee Palmer |
| Doug Conner | Lyle Jensen | Philip C. Peick |
| Steve Cory | Jared Goddard | Dave Price |
| David Davis | Barbara Gilbert | Creston Robinson |
| Erik Ryberg | John Geddie | Roy Peterson |
| Bill Scheufele | John M. Leonard | Ron Yockim |

## Interdisciplinary Team

The following Forest Service personnel served on the Interdisciplinary Team (IDT) that prepared this environmental assessment:

### Core Interdisciplinary Team:

| | |
|---|---|
| Michael Burns | Team Leader, Silviculture |
| Janet Plocharsky | Environmental Coordinator, Writer/Editor, Visual Quality, Unroaded Areas |
| Dale Boyd | Fire, Fuels, Air Quality |
| Randy Scarlett | Wildlife |
| Kristy Groves | Fisheries |

### Interdisciplinary Team Consultants:

| | |
|---|---|
| Tom Mafera | District Ranger |
| Al Scott | Acting District Ranger |
| Dave Kendrick | Silviculture, Economics |
| Ed Farren | Water Quality, Soils |
| Lori Seitz | Roads, Recreation |
| Gary Popek | Geographic Information Services |
| Tommy Fulgham | Cultural and Historical Properties |
| Don Justice | Silviculture |
| Dave Powell | Silviculture |
| Craig Busskohl | Soils |
| Charlie Gobar | Wildlife |
| Dave Herr | National Environmental Policy Act Consultant |
| Brian Spivey | Harvest Systems |
| Hank Falcon | Fire, Fuels, Air Quality |
| Jean Wood | Botany |
| Tim Collins | Range, Noxious Weeds |

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# Appendix A – Best Management Practices

Best Management Practices are the primary mechanisms used to enable the achievements of water quality standards (Environmental Protection Agency 1987). The Environmental Protection Agency has certified the Oregon Forest Practices Act and Washington Forest Practices Rules and Regulations as best management practices. The States of Oregon and Washington compared Forest Service practices with these State practices and concluded that Forest Service practices meet or exceed state requirements.

Every year since 1996, the Umatilla National Forest has monitored a selection of projects for implementation and effectiveness of best management practices. The results of this monitoring have been published in annual Umatilla National Forest's Forest Plan Monitoring and Evaluation Reports, which were combined with the Wallowa Whitman and Malheur National Forests' reports in 1998 into Monitoring and Evaluation Reports for the National Forests of the Blue Mountains. A substantial record of results exists. Some of these results are summarized in a poster which has been published on the internet. The poster is available on the Umatilla NF's web site (http://www.fs.fed.us/r6/uma/water/), scroll down to Best Management Practices Monitoring Poster. The poster reports monitoring of timber sale riparian area boundaries, skid trail rehabilitation, and road decommissioning. Specific findings include:

Implementation of Riparian Habitat Conservation Area buffers on harvest units generally met objectives, need improved documentation of stream category during layout. On the Sunflower Bacon project the district hydrologist visited streams to determine classifications before project layout. Any reclassifications where updated in the stream layer database before thinning units or burn blocks were designated.

Use of harvester-forwarder systems results in more slash on skid trails, less ground disturbance, and reduces need for structural erosion control (waterbars).

Road decommissioning activities were properly implemented and effective; some sites need re-vegetating.

Documenting best management practices effectiveness still poses challenges, requires longer time frame for monitoring, and integration with instream water quality monitoring programs.

The following Best Management Practices apply to the Sunflower Bacon Project.

## Timber Management

### T-1. Timber Sale Planning Process

- Description – Introduce hydrologic considerations into timber sale planning process
- Location – Harvest units and haul routes.
- Effects – Avoidance of potential damage during and following the sale layout and subsequent logging operation.
- Application – Detrimental impacts to soil, riparian areas, and downstream water sources are reduced.

### T-2 Timber Harvest Unit Design

- Description – Design timber harvest to secure favorable conditions of water flow, water quality and fish habitat.
- Location – All harvest units.
- Effects – Where adverse impacts on the water resource can result, the harvest unit design is modified, and/or watershed treatment measures are applied to accelerate the natural recovery rate.
- Application – Detrimental impacts to soil, riparian areas, and downstream water sources are reduced through location of units and Project Design Elements 1, 3-6, 8-11, and 17.

## T-3 Use of Erosion Potential Assessment for Timber Harvest Unit Design

- Description – Identify areas with high erosion potential and adjust harvest unit design as necessary.
- Location – All harvest units.
- Effects – Modify or eliminate harvest activities on areas with high erosion potential.
- Application – Unit location modified to avoid areas of high concern; Project Design Elements 3-5, 8-11 and 17 to reduce effects of erosion associated with harvest.

## T-4 Use of Area Maps for Designing Water Quality Protection Needs

- Description – Delineate the location of protection areas and available water sources for both the Purchaser and the Sale administrator to insure their recognition and proper consideration and protection on the ground.
- Location – Entire sale area.
- Effects – Detrimental impacts to protected areas are reduced.
- Application – Protected areas are identified on the Sale Area Map.

## T-5 Limiting Operating Season

- Description – Ensure that the purchaser conducts operations in a timely manner, within the period specified in the timber sale contract.
- Location – All harvest units and haul routes.
- Effects – Detrimental impacts to soils, water, and other resources are reduced.
- Application – Project Design Element 9 was identified to limit operation periods in order to protect soils.

## T-7 Streamside Management Unit Design

- Description – Harvest is designed to ensure protection of streambanks and streamside vegetation.
- Location – All harvest units.
- Effects – Minimize potential adverse effects of logging and related land disturbance

activities on water quality and beneficial uses.

- Application – Units were identified in uplands, and Project Design Elements 1, 3, 4, 6, 8, 17, and, 27 would avoid activities within Riparian Habitat Conservation Areas.

## T-8 Streamcourse Protection (Implementation and Enforcement)

- Description – (1) Protect the natural flow of streams, (2) Provide unobstructed passage of streamflows and (3) Prevent sediment and other pollutants from entering streams.
- Location – All harvest units.
- Effects – Potential adverse effects to streams from harvest activities would be minimized to maintain water quality.
- Application – Project Design Elements 1, 3-6, 8-11 and 17 would be monitored by the District Aquatics Specialist and/or Timber Sale Administrator.

## T-9 Determining Tractor Loggable Ground

- Description – Tractor logging is restricted to lands that can be harvested with a minimum of soil compaction and erosion. Factors considered when selecting tractor operable land are: slope, topography, soil texture, soil drainage, and drainage patterns.
- Location – land suitable for tractor logging is identified in the pre-sale (planning) phase of the timber sale planning process. Provisions in the Timber Sale Contract (TSC) specify the areas and conditions upon which tractors can operate. Requirements governing tractor operations are incorporated in the Timber Sale Contract (TSC).
- Effects – Detrimental impacts (compaction, displacement, erosion) to soils and potential impacts to downstream water quality are reduces by determining the most effective logging operational method.
- Application – All alternatives specify the units located on land harvestable by tractor, and Project Design Element 5 further restrict harvest options to protect soil and water quality.

## T-10 Log Landing Location

- Description – Locate landings to minimize creation of hazardous watershed conditions.
- Location – All harvest units.
- Effects – detrimental impacts (compaction, displacement, erosion) to soils and potential impacts to downstream water quality are reduced.
- Application – As per Project Design Element 10, the Timber Sale Administrator approves landings, using existing landings where possible. New landings will not be constructed inside PACFISH Riparian Habitat Conservation Areas, cultural sites, or in-place emergency rehabilitation structures, however existing landings located within Riparian Habitat Conservation Areas would be used to minimize soil disturbance.

## T-11 Tractor Skid Trail Location and Design

- Description – Locate and approve skid trails in advance of skidding to minimize soil compaction, erosion, and water runoff.
- Location – All harvest units.
- Effects – Careful control of skidding patterns can minimize on-site compaction and off-site soil movement.
- Application – Project Design Element 10 would reduce soil disturbance and compaction due to skid trails. The Timber Sale Administrator approves skid trails, using existing trails where possible. No new skid trails will be located inside PACFISH Riparian Habitat Conservation Areas, cultural sites, or in-place emergency rehabilitation structures, however existing skid trails would be used to minimize soil disturbance.

## T-13 Erosion Prevention and Control Measures During Timber Sale Operations

- Description – Ensure that the purchaser's operation shall be conducted to minimize soil erosion.
- Location – All harvest units.
- Effects – Prevent/control erosion and sediment movement.
- Application – The Timber Sale Contract sets forth Purchaser's responsibilities, including Project Design Elements 1, 3-6, 8-11 and 17. The Timber Sale Administrator monitors operations for compliance.

## T-14 Revegetation of Areas Disturbed by Harvest Activities

- Description – Where soil has been severely disturbed by the Purchaser's operation, and the establishment of vegetation/cover is needed to minimize erosion and protect water quality, the Purchaser shall take appropriate measures normally used to establish an adequate cover of grass or other vegetation (i.e. seeding) as necessary, or take other agreed upon stabilization measures.
- Location – All harvest units.
- Effects – Vegetation cover will be established on disturbed sites to prevent erosion and sedimentation.
- Application – Project Design Element 12 details when and how re-vegetation will occur.

## T-15 Log Landing Erosion Prevention and Control

- Description - Landings will be monitored for erosion and compaction, and treated where necessary.
- Location – All harvest units.
- Effects – Soil erosion and compaction are reduced.
- Application – Project Design Element 11 would require water bars, subsoiling, and seeding as necessary, to be monitored by the Timber Sale Administrator or Aquatics

Specialist.

## T-16 Erosion Control on Skid Trails

- Description – Design skid trails to protect water quality by minimizing erosion and sedimentation.
- Location – All skid trails.
- Effects – Water quality is protected by minimizing erosion and sedimentation derived from skid trails.
- Application – Project Design Element 10 would require review and approval of skid trail locations and Project Design Element 11 would require rehabilitation of skid trails after harvest.

## T-18 Erosion Control Structure Maintenance

- Description - Ensure that constructed erosion control structures are stabilized and working.
- Location - All harvest units.
- Effects - Long-term soil productivity is maintained and impacts to downstream water quality are reduced.
- Application – Project Design Elements 9, 16 and 17 would require that haul routes be maintained to prevent unacceptable resource damage.

## T-19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

- Description - Ensure purchaser completes adequate erosion control work on timber sales.
- Location - All harvest units.
- Effects - Detrimental impacts to water quality are eliminated by reducing erosion and sediment movement to downstream water sources.
- Application - Timber Sale Administrator would perform inspections before the sale is closed to check for effectiveness of erosion control work completed by the purchaser.

## T-21 Servicing and Refueling of Equipment

- Description - Prevent pollutants from being discharged into or near rivers, streams, and impoundments or into natural or man-made channels leading to such areas.
- Location - All harvest units.
- Effects - Detrimental impacts to water quality will be reduced by restricting fueling locations to certain areas.
- Application - Servicing of all equipment would be done only in areas approved by the Forest Service so that any spills would not reach a stream course or wet area. The District has a Hazardous Spill Plan in place. The timber sale contract will prohibit the

spillage of hazardous substances, and will require the purchaser to have a hazardous material plan. The timber sale contract will require the purchaser to have a fuel spill prevention plan if on-site quantities are greater than 660 gallons in one container or a total of more than 1,320 gallons.

### T-22 Modification of Timber Sale Contract

- Description - Modify the Timber Sale Contract if new circumstances or conditions arise that indicate that the timber sale will irreversibly damage soil, water, or watershed values.
- Location - All harvest units.
- Effects - Watershed values are placed ahead of timber harvest.
- Application - The Chief of the Forest Service could modify the Timber Sale Contract if watershed values are unacceptably compromised.

## *Road System*

### R-4 (Temporary) Road Slope Stabilization (Planning)

- Description – Road stabilization considerations begin in the reconnaissance and location of temporary roads. Stabilization measures will be planned for completion on all disturbed ground prior to the winter season, when erosion is most severe.
- Location – Construction of temporary roads to or within units 33, 38, 47, 48, 59, 63, 64, 65, 66, 70, 71, 74, 83, 90, and 96.
- Effects – Reduce sedimentation by minimizing erosion from road slopes and minimizing the chances for slope failure along roads.
- Application – Project Design Elements 9 and 16 would minimize the sedimentation from the temporary roads. Specifications are also listed in the Timber Sale Contract.

### R-7 Control of Surface Road Drainage Associated with Roads

- Description - Minimize possible detrimental effects of surface drainage of road.
- Location – All haul routes.
- Effects - Reduce sedimentation associated with roads.
- Application - Project Design Element 16 would minimize the erosive effects of water concentrated by road drainage features and disperse runoff from the road using water spreading ditches and drivable dips.

### R-18 Maintenance of Roads

- Description - Provide for water quality protection by maintaining roads through the control of waste material placement, keeping drainage facilities open, and by repairing ruts and failures.
- Location - All Level 1 and above roads.

- Effects - Detrimental impacts to water quality from road maintenance activities are reduced.
- Application – Road maintenance will be incorporated into the Timber Sale Contract as needed.

### R-19 Road Surface Treatments to Prevent Loss of Material

- Description - Minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.
- Location - All Level 1 and above roads.
- Effects - Detrimental impacts to the road prism from erosion and adjacent water sources are prevented.
- Application – Project Design Element 16 would control dust during dry periods.

### R-20 Traffic Control During Wet periods

- Description - Reduce road surface damage and rutting of roads to lessen sediment washing from road surfaces.
- Location - All haul routes.
- Effects - Detrimental impacts to forest road surfaces and forest road users are reduced.
- Application – Project Design Elements 9 and 16 would protect roads during wet conditions.

### R-23 Obliteration of Landings

- Description – Measure designed to obliterate temporary roads and landings and revegetated, drain, etc. To minimize erosion and sedimentation. Temporary roads will be sub-soiled on completion of activities; Landings will be sub-soiled on completion of sale activities. Subsoiling must alleviate compaction without churning the soil.
- Location - All landings and temporary roads used by the timber sale purchaser.
- Effects – Improve wildlife habitat, minimize erosion and reduce sedimentation to downstream water sources.
- Application – Project Design Element 11 would treat landings upon completion of sale activities using subsoiling, waterbarring, and/or seeding (subsoiling must alleviate compaction without churning the soil).

## *Fire Suppression and Fuels Management*

### F-1 Fire and Fuel Management Activities

- Description - Reduce the public and private losses that could result from wildfire and/or subsequent flooding and erosion by reducing the frequency, intensity, and destructiveness of wildfire.

- Location - All treatment units.
- Effects - Increased fire-tolerant species in the stands, reduced fuel loads, and breaks in horizontal and vertical fuels which would facilitate application of prescribed natural fire and fire suppression activities, would reduce erosion and sediment related to a large-scale, severe wildfire.
- Application – The action alternatives contain design elements that would reduce activity-related and natural fuels once treatments are complete. Also Project Design Element 25 would reduce fire intensity in treatment of thinning debris.

### F-2 Consideration of Water Quality in Formulating Prescribed Fire Prescriptions

- Description - Maintain water quality by limiting the amount of soil exposed by prescribed burning.
- Location - All treatment units.
- Effects - Limited soil erosion and reduced water quality impacts.
- Application - Project Design Elements 25 and 26 would ensure that fire prescriptions use factors such as weather, slope, aspect, soil moisture, and fuel moisture to maintain prescribed flame lengths and maintain desired soil and vegetative cover. Project Design Element 27 would limit effects on soils due to fire control lines.

### F-3 Protection of Water Quality During Prescribed Burning Operations

- Description - Maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering water bodies.
- Location - All treatment units.
- Effects - Water quality will be maintained; downstream users of water will not be affected.
- Application - Weather and fuel conditions will be checked during prescribed burning to ensure that soil and water protection parameters set by the burn prescription (including Project Design Elements 25-27) are met; otherwise burn techniques will be adjusted accordingly.

## *Watershed*

### W-3 Protection of Wetlands

- Description - Avoid adverse water quality impacts associated with destruction or modification of wetlands by excluding activities within wetlands.
- Location - All harvest units.
- Effects - Wetlands are protected from degradation.
- Application - Project Design Elements 1, 3-6, 8-11, 16 and 26-27will exclude ground-disturbing activities within wetlands; the fire prescription will address maintaining vegetative cover in wetlands during prescribed burning.

## W-4 Hazardous Substance Spill Contingency Plan and Spill Prevention Control and Countermeasure Plan

- Description - Prevent contamination of Umatilla National Forest from accidental spills.
- Location - entire sale area; spill plan is located at the Umatilla N.F. Supervisor's Office.
- Effects - Oil products are prevented from entering the navigable waters of the United States.
- Application - Standard language in the sale contract addresses fueling and maintenance of equipment.

## W-5 Cumulative Watershed Effects

- Description - Protect the beneficial uses of water from the cumulative effects of past, present, and future management activities that could result in degraded water quality or stream habitat.
- Location - Entire project area.
- Effects - Activities that could result in cumulative damage to water quality are altered or eliminated as appropriate.
- Application - A cumulative watershed effects analysis was conducted for the Sunflower Bacon project area and beneficial uses that comply with applicable State requirements for protection of waters have been identified in the Environmental Assessment.

## W-7 Water Quality Monitoring

- Description - Determine the effects of the proposed action on the beneficial uses of water, monitor baseline watershed conditions for comparison with State Water Quality and Forest Plan standards and estimate long-term trends, ensure the health and safety of water users, and evaluate BMP effectiveness.
- Location - Entire project area.
- Effects - Monitoring would ensure that mitigation to protect water quality is effective, and, if not, would recommend changes for future activities.
- Application - Monitoring items 1, 3, and 7 checks that applicable standard operating procedures were implemented and effective.

## W-8 Management by Closure to Use (Seasonal, Temporary, and Permanent)

- Description - Exclude activities that could result in damage to either resources or improvements, such as roads and trails, resulting in impaired water quality.
- Location - All harvest units.
- Effects - Maintain down slope water quality, sustain the current condition of the watershed, and exclude activities that may result in additional resource damage and impair healthy water systems.
- Application - Project Design Element 9 would limit management activities to protect soil

and wildlife during sensitive periods.

# Appendix B – Unit Data Sheet

| Unit No. | Alt 2 | Alt. 3 | Alt. 4 | Acres | Slope | Aspect | Elevation (Feet) | Township | Plant Association | PCT/Juniper |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Y | Y | Y | 22 | 10% | East | 4300 | T 6S, R 26E, Sec. 25 & 26 | PSME/CAGE2 | no |
| 4 | Y | Y | Y | 9 | 10% | southeast | 4200 | T 6S, R 26E, Sec. 25 | ABGR/CAGE=PSME/CAGE | no |
| 5 | Y | Y | Y | 17 | 15% | East | 4200 | T 6S, R 26E, Sec. 25 | PSME/CAGE2 | juniper |
| 6 | Y | Y | Y | 19 | 10% | South | 4200 | T 6S, R 26E, Sec. 25 & 26 | PSME/SYAL | juniper |
| 7 | Y | Y | Y | 35 | 15% | South | 4150 | T 6S, R 26E, Sec. 25 & 26 | PSME/SYAL | no |
| 8 | Y | Y | Y | 33 | 15% | NE to S | 4150 | T 6S, R 26E, Sec. 36 | PSME/CAGE2 | PCT/Juniper |
| 9 | Y | Y | Y | 29 | 15% | E to SE | 4150 | T 6S, R 26E, Sec. 25 | PSME/SYAL | PCT/Juniper |
| | | | | | | | | T 6S, R 27E, Sec. 30 & 31 | | |
| 10 | Y | Y | Y | 25 | 10% | NE | 4100 | T 6S, R 26E, Sec. 36 | PSME/SYAL | juniper |
| 11 | Y | Y | Y | 47 | 10% | NE | 4250 | T 6S, R 26E, Sec. 35 | PSME/SYAL | no |
| 13 | Y | Y | Y | 22 | 10% | SE | 3900 | T 7S, R 27E, Sec. 19 | PIPO/CARU | no |
| 14 | Y | N | Y | 65 | 25% | SE | 4000 | T 6S, R 27E, Sec. 22 & 27 | PIPO/CAGE | no |
| 15 | Y | N | N | 19 | 15% | N to NW | 3600 | T 6S, R 27E, Sec. 34 | PSME/CARU | no |
| 16 | Y | Y | Y | 12 | 15% | NW | 3850 | T 6S, R 27E, Sec. 27 | PSME/CAGE2 | no |
| 17 | Y | N | N | 167 | 18% | West | 3800 | T 6S, R 27E, Sec. 27 | PSME/SYAL | no |
| 18 | Y | Y | Y | 4 | 25% | West | 4150 | T 6S, R 26E, Sec. 25 | PSME/SYAL | no |
| 20 | Y | Y | Y | 83 | 15% | W to NW | 3700 | T 6S, R 27E, Sec. 27 & 34 | PSME/SYAL | no |
| 22 | Y | Y | Y | 39 | 15% | West | 3850 | T 6S, R 27E, Sec. 27 & 34 | PSME/CAGE2 | no |

| Unit No. | Alt 2 | Alt. 3 | Alt. 4 | Acres | Slope | Aspect | Elevation (Feet) | Township | Plant Association | PCT/Juniper |
|---|---|---|---|---|---|---|---|---|---|---|
| 23 | Y | N | Y | 116 | 15% | W to NW | 3600 | T 6S, R 27E, Sec. 33 & 34 | PSME/SYAL | no |
| 24 | Y | Y | Y | 6 | 10% | SW to W | 3700 | T 6S, R 27E, Sec. 34 | PSME/CAGE2 | no |
| 27 | Y | Y | Y | 42 | 22% | East | 3800 | T 6S, R 27E, Sec. 28 | PIPO/CAGE2 | PCT/Juniper |
| 28 | Y | N | N | 11 | 35% | East | 3800 | T 6S, R 27E, Sec. 33 | PSME/SYAL | juniper |
| 29 | Y | Y | Y | 20 | 15% | East | 3850 | T 6S, R 27E, Sec. 28, 29, 32 & 33 | PIPO/SYAL | PCT |
| 30 | Y | N | Y | 19 | 30% | East | 3700 | T 6S, R 27E, Sec. 33 | PSME/CAGE2 | no |
| 31 | Y | Y | Y | 10 | 15% | South | 3500 | T 6S, R 27E, Sec. 33 | PSME/SYAL | no |
| 32 | Y | Y | Y | 5 | 35% | NE | 3600 | T 6S, R 27E, Sec. 28 & 33 | PSME/SYAL | no |
| 33 | Y | Y | Y | 18 | 35% | East | 3700 | T 6S, R 27E, Sec. 33 | PSME/SYAL PIPO/CARU | no |
| 34 | Y | Y | Y | 9 | 20% | East | 3800 | T 6S, R 27E, Sec. 32 & 33 | PSME/SYAL PIPO/CARU | PCT/Juniper |
| | | | | | | | | T 7S, R 27E, Sec. 4 | | |
| 35 | Y | Y | Y | 45 | 15% | East | 3400 | T 6S, R 27E, Sec. 33 | PSME/CARU | juniper |
| | | | | | | | | T 7S, R 27E, Sec. 3 & 4 | | |
| 36 | Y | Y | Y | 34 | 25% | West | 3400 | T 6S, R 27E, Sec. 33 | PIPO/CARU | PCT |
| | | | | | | | | T 7S, R 27E, Sec. 3 | | |
| 37 | Y | N | Y | 8 | 15% | SW | 3400 | T 7S, R 27E, Sec. 4 | PSME/SYAL PIPO/CARU | no |
| 38 | Y | N | Y | 115 | 30% | East | 3400 | T 7S, R 27E, Sec. 3 & 4 | PSME/CAGE2 | no |
| 39 | Y | N | N | 31 | 30% | North | 3600 | T 7S, R 27E, Sec. 7 & 8 | PSME/SYAL | PCT |
| 40 | Y | Y | Y | 10 | 20% | NE | 3600 | T 7S, R 27E, Sec. 8 | PSME/SYAL | no |
| 41 | Y | N | N | 3 | 25% | NE | 3850 | T 7S, R 27E, Sec. 7 | PSME/SYAL | no |

| Unit No. | Alt 2 | Alt. 3 | Alt. 4 | Acres | Slope | Aspect | Elevation (Feet) | Township | Plant Association | PCT/Juniper |
|---|---|---|---|---|---|---|---|---|---|---|
| 42 | Y | Y | Y | 15 | 25% | NE | 3900 | T 7S, R 27E, Sec. 7 | PSME/SYAL | no |
| 43 | Y | Y | Y | 29 | 20% | East | 3600 | T 7S, R 27E, Sec. 6, 7 & 8 | PSME/SYAL | no |
| 44 | Y | Y | Y | 9 | 15% | East | 3800 | T 7S, R 27E, Sec. 7 | PSME/SYAL | no |
| 45 | Y | N | N | 28 | 35% | NW to NE | 4000 | T 7S, R 27E, Sec. 6 & 7 | PSME/SYAL | no |
| 47 | Y | Y | Y | 19 | 15% | East | 3750 | T 7S, R 27E, Sec. 8 | PSME/SYAL | juniper |
| 48 | Y | Y | Y | 31 | 15% | West | 3950 | T 6S, R 27E, Sec. 21 | PSME/CARU | PCT/Juniper |
| 49 | Y | Y | Y | 13 | 25% | E to SE | 4000 | T 6S, R 27E, Sec. 20 & 29 | PSME/CARU PSME/SYAL | no |
| 50 | Y | Y | Y | 19 | 10% | South | 4250 | T 6S, R 26E, Sec. 26 | PSME/SYAL | no |
| 52 | Y | Y | Y | 28 | 25% | West | 3900 | T 7S, R 27E, Sec. 5 & 6 | PSME/SYAL | no |
| 53 | Y | Y | Y | 15 | 15% | SE to NE | 3750 | T 7S, R 27E, Sec. 7 & 8 | PIPO/FEID | juniper |
| 54 | Y | N | N | 19 | 20% | SE | 4000 | T 7S, R 27E, Sec. 7 | PSME/SYAL | juniper |
| 55 | Y | Y | Y | 30 | 15% | East | 4150 | T 7S, R 27E, Sec. 7 & 18 | PSME/CAGE2 | PCT/Juniper |
| 56 | Y | Y | Y | 153 | 30% | NE | 3800 | T 7S, R 27E, Sec. 7, 17 & 18 | PSME/SYAL | juniper |
| 57 | Y | Y | Y | 31 | 20% | East | 3800 | T 7S, R 27E, Sec. 17 & 18 | PSME/SYAL | no |
| 59 | Y | Y | Y | 23 | 35% | NE | 3900 | T 7S, R 27E, Sec. 19 & 20 | PSME/SYAL | no |
| 61 | Y | Y | Y | 20 | 15% | West | 4100 | T 6S, R 27E, Sec. 16 & 17 | PIPO/CARU | no |
| 62 | Y | Y | Y | 80 | 15% | N to NE | 3500 | T 7S, R 27E, Sec. 17 | PSME/SYAL | no |
| 63 | Y | Y | Y | 15 | 15% | NE | 4100 | T 6S, R 26E, Sec. 36 | PSME/CAGE2 | no |
| 64 | Y | Y | Y | 19 | 10% | East | 4100 | T 6S, R 26E, Sec. 36 | PSME/SYAL | juniper |
| 65 | Y | Y | Y | 32 | 18% | North | 4100 | T 6S, R 26E, Sec. 36 | PSME/SYAL ABGR/CAGE | no |

| Unit No. | Alt 2 | Alt. 3 | Alt. 4 | Acres | Slope | Aspect | Elevation (Feet) | Township | Plant Association | PCT/Juniper |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | T 7S, R 26E, Sec. 1 | | no |
| | | | | | | | | T 7S, R 27E, Sec. 6 | | no |
| 66 | Y | N | N | 5 | 10% | East | 4100 | T 6S, R 27E, Sec. 17 | PIPO/CARU | no |
| 67 | Y | Y | Y | 7 | 10% | East | 4050 | T 6S, R 27E, Sec. 16 & 17 | PIPO/CARU | no |
| 68 | Y | Y | Y | 15 | 15% | East | 4050 | T 6S, R 27E, Sec. 21 | PSME/SYAL | no |
| 70 | Y | Y | Y | 9 | 30% | East | 3900 | T 6S, R 27E, Sec. 21 | PSME/SYAL PSME/CAGE2 | PCT |
| 71 | Y | Y | Y | 6 | 35% | N to NE | 3900 | T 6S, R 27E, Sec. 21 | PSME/SYAL PSME/CAGE2 | PCT |
| 72 | Y | Y | Y | 21 | 32% | NE | 4000 | T 6S, R 27E, Sec. 31 | PSME/SYAL PSME/CARU | PCT |
| 73 | Y | N | Y | 22 | 25% | NE | 3900 | T 6S, R 27E, Sec. 31 | PSME/SYAL PSME/CARU | no |
| 74 | Y | N | Y | 52 | 25% | NE | 3900 | T 6S, R 27E, Sec. 31 & 32 | PSME/SYAL PSME/CAGE | juniper |
| 75 | Y | Y | Y | 20 | 35% | NE | 3800 | T 6S, R 27E, Sec. 31 & 32 | ABGR/CAGE | PCT |
| 77 | Y | Y | Y | 15 | 25% | SW | 3600 | T 6S, R 27E, Sec. 32 | PSME/SYAL | no |
| 79 | Y | Y | Y | 36 | 30% | East | 3600 | T 7S, R 27E, Sec. 4 & 5 | PSME/SYAL | no |
| 80 | Y | Y | Y | 11 | 15% | North | 3200 | T 7S, R 27E, Sec. 4 | PSME/CAGE2 | PCT |
| 81 | Y | N | N | 16 | 15% | East | 3600 | T 7S, R 27E, Sec. 17 | PSME/SYAL | no |
| 82 | Y | Y | Y | 5 | 15% | NE | 3500 | T 7S, R 27E, Sec. 17 | PSME/SYAL | PCT |
| 83 | Y | N | Y | 35 | 35% | SE | 3400 | T 7S, R 27E, Sec. 8 & 17 | PSME/CAGE2 | PCT/Juniper |
| 84 | Y | Y | Y | 24 | 20% | SE | 3400 | T 7S, R 27E, Sec. 8 & 17 | PIPO/FEID | PCT/Juniper |
| 85 | Y | Y | Y | 12 | 20% | SE | 3600 | T 7S, R 27E, Sec. 8 | PSME/SYAL | PCT/Juniper |

| Unit No. | Alt 2 | Alt. 3 | Alt. 4 | Acres | Slope | Aspect | Elevation (Feet) | Township | Plant Association | PCT/Juniper |
|---|---|---|---|---|---|---|---|---|---|---|
| 86 | Y | Y | Y | 140 | 15% | SW | 4200 | T 6S, R 27E, Sec. 5, 7, 8, 17, 18 | PSME/CAGE2 | no |
| 90 | Y | N | Y | 8 | 35% | NE | 3350 | T 7S, R 26E, Sec. 8 | PSME/SYAL | no |
| 91 | Y | Y | Y | 17 | 15% | South | 3700 | T 6S, R 27E, Sec. 34 | PSME/SYAL | PCT/Juniper |
| 92 | Y | N | N | 100 | 15% | S to SW | 3800 | T 6S, R 27E, Sec. 34 & 35 | PSME/SYAL PIPO/CARU | PCT/Juniper |
| 93 | Y | N | Y | 13 | 20% | E to NE | 3800 | T 7S, R 27E, Sec. 7 | PSME/SYAL | juniper |
| 95 | Y | Y | Y | 16 | 20% | North | 3500 | T 6S, R 27E, Sec. 33 & 34 | PSME/SYAL | no |
| 96 | Y | Y | Y | 74 | 20% | SW | 3400 | T 7S, R 27E, Sec. 3 | PSME/SYAL | no |
| 101 | Y | Y | Y | 37 | 15% | NE | 4300 | T 6S, R 26E, Sec. 13 & 14 | PSME/SYAL | PCT/Juniper |
| 103 | Y | Y | Y | 53 | 25% | S - SE | 4200 | T 6S, R 26E, Sec. 24 | PSME/SYAL | PCT/Juniper |
| 104 | Y | Y | Y | 4 | 25% | EAST | 4150 | T 6S, R 27E, Sec. 19 | PSME/SYAL | PCT/Juniper |
| 105 | Y | Y | Y | 12 | 15% | SOUTH | 4100 | T 6S, R 27E, Sec. 19 | PSME/SYAL | PCT/Juniper |
| 106 | Y | Y | Y | 8 | 25% | EAST | 4150 | T 6S, R 26E, Sec. 25 | PSME/SYAL | PCT/Juniper |
| | | | | | | | | T 6S, R 27E, Sec. 30 | | |
| 107 | Y | Y | Y | 40 | 25% | NORTH | 4200 | T 6S, R 26E, Sec. 25 | PSME/SYAL | PCT/Juniper |
| 108 | Y | Y | Y | 59 | 25% | EAST | 4000 | T 6S, R 27E, Sec. 19 | PSME/SYAL | PCT/Juniper |
| 110 | Y | Y | Y | 19 | 25% | SW | 4000 | T 6S, R 27E, Sec. 19 | PSME/SYAL | PCT/Juniper |
| 111 | Y | Y | Y | 6 | 25% | NORTH | 4100 | T 6S, R 27E, Sec. 19 | PSME/SYAL | PCT/Juniper |
| 112 | Y | Y | Y | 1 | 25% | EAST | 4100 | T 6S, R 27E, Sec. 19 | PSME/SYAL | PCT/Juniper |
| 113 | Y | Y | Y | 16 | 15% | SW | 4100 | T 6S, R 26E, Sec. 24 | PSME/SYAL | PCT/Juniper |
| | | | | | | | | T 6S, R 27E, Sec. 19 | | |

| Unit No. | Alt 2 | Alt. 3 | Alt. 4 | Acres | Slope | Aspect | Elevation (Feet) | Township | Plant Association | PCT/Juniper |
|---|---|---|---|---|---|---|---|---|---|---|
| 114 | Y | Y | Y | 56 | 20% | SOUTH | 4000 | T 6S, R 27E, Sec. 18, 19, 20 | PSME/SYAL | PCT/Juniper |
| 115 | Y | Y | Y | 8 | 20% | WEST | 4000 | T 6S, R 27E, Sec. 18 | PSME/SYAL | PCT/Juniper |
| 116 | Y | Y | Y | 107 | 30% | EAST | 3900 | T 6S, R 27E, Sec. 17, 18, 20, 29 | PSME/SYAL | PCT/Juniper |
| 117 | Y | Y | Y | 6 | 15% | EAST | 3700 | T 7S, R 27E, Sec. 17 | PSME/SYAL | PCT/Juniper |
| 118 | Y | Y | Y | 11 | 15% | NE | 3600 | T 7S, R 27E, Sec. 17 | PSME/SYAL | PCT/Juniper |
| 119 | Y | Y | Y | 35 | 30% | SOUTH | 4000 | T 6S, R 26E, Sec. 25 | PSME/SYAL | PCT/Juniper |
| | | | | | | | | T 6S, R 27E, Sec. 30 | | |
| 121 | Y | Y | Y | 14 | 20% | EAST | 4000 | T 6S, R 27E, Sec. 30 & 31 | PSME/SYAL | PCT/Juniper |
| 122 | Y | Y | Y | 37 | 15% | EAST | 4300 | T 6S, R 26E, Sec. 13 & 24 | PSME/SYAL | PCT/Juniper |
| 123 | Y | Y | Y | 4 | 25% | WEST | 4100 | T 7S, R 27E, Sec. 18 | PSME/SYAL | PCT/Juniper |
| 124 | Y | Y | Y | 26 | 20% | SE | 4200 | T 6S, R 26E, Sec. 24 & 25 | PSME/SYAL | PCT/Juniper |
| 125 | Y | Y | Y | 30 | 35% | NORTH | 4000 | T 6S, R 27E, Sec. 30 | PSME/SYAL | PCT/Juniper |
| 126 | Y | Y | Y | 31 | 35% | NORTH | 4000 | T 6S, R 27E, Sec. 30 | PSME/SYAL | PCT/Juniper |
| 127 | Y | Y | Y | 36 | 20% | WEST | 3400 | T 6S, R 27E, Sec. 3 | PSME/SYAL | PCT/Juniper |
| 128 | Y | Y | Y | 25 | 15% | SOUTH | 4200 | T 6S, R 26E, Sec. 25 | PSME/SYAL | PCT/Juniper |
| 129 | Y | N | Y | 23 | 20% | NORTH | 3600 | T 7S, R 27E, Sec. 8 | PSME/SYAL | PCT/Juniper |

# Appendix C – Screens Consistency

On August 18, 1993, the Regional Forester for the USDA Forest Service, Region 6 issued direction to screen timber sales to ensure that all sales are consistent with the National Forest Management Act viability requirements for old growth-associated species (Lowe, 1993). That direction was modified and extended on May 20, 1994 (Lowe, 1994) and further modified in 1995 (USDA Forest Service 1995a). The 1995 document amended the Umatilla National Forest Land and Resource Management Plan (Forest Plan) as Forest Plan Amendment #11. That current direction, often referred to as the "Timber Sale Screens", includes specific direction to pass each timber sale proposal through a set of interim ecosystem and wildlife standards.

This document documents how the timber sale activities proposed in the Sunflower Bacon Environmental Analysis (EA) complies with the Timber Sale Screens. In the following table, the left hand column displays specific direction from the Screens. The column on the right describes how the Sunflower Bacon EA addresses that direction.

| Interim Wildlife Standard | Sunflower Bacon Project |
|---|---|
| The interim wildlife standard has two possible scenarios to follow based on the Historical Range of Variability (HRV) for each biophysical environment within a given watershed. For the purposes of this standard, late and old structural stages (LOS) can be either "Multi-strata with Large Trees", or "Single Strata with Large Trees", as described in Table 1 of the Ecosystem Standard. These LOS stages can occur separately or in some cases, both may occur within a given biophysical environment.<br>LOS stages are calculated separately in the interim ecosystem standard. Use Scenario A whenever any one type of LOS is below HRV. If both types occur within a single biophysical environment and one is above HRV and one below, use Scenario A. Only use Scenario B when both LOS stages within a particular biophysical environment are at or above HRV. | Sunflower Bacon falls within Scenario A. For the purpose of calculating HRV, all effects analysis was calculated on the subwatershed area scale on National Forest lands. In dry forest biophysical environments, old forest single-stratum (OFSS) was below the lower limit of HRV and old forest multi-strata (OFMS) was above the upper limit of HRV. Because OFSS is below HRV, the project falls within Scenario A. |

| | |
|---|---|
| a. The following sale types were exempted from consideration of HRV through the interim ecosystem standard, but must still meet the intent of the wildlife standards by following the direction provided in Scenario A, 1) through 4), as applicable to the type of sale being proposed, and regardless of whether the stand is LOS or not:<br>precommercial thinning sales,<br>sales of material sold as fiber,<br>sales of dead material less than sawlog size (7-inch dbh) with incidental green volume,<br>salvage sales with incidental green volume located outside currently mapped old growth,<br>commercial thinning and/or understory removal sales located outside currently mapped old growth. | An HRV analysis has been completed for the Sunflower Bacon Analysis Area. The HRV analysis is included in the analysis file for the project, and is summarized in the EA. |
| Scenario A | |
| If either one or both of the late and old structural (LOS) stages falls BELOW HRV in a particular biophysical environment within a watershed, then there should be NO NET LOSS OF LOS from that biophysical environment. DO NOT allow timber sale harvest activities to occur within LOS stages that are BELOW HRV. | OFSS within the Sunflower Bacon Analysis Area is below HRV in dry forest biophysical environments. During the early planning for this project, units recommended for treatment were compared with maps of OFSS stands. All units that fell within dry forest OFSS stands were either dropped from further consideration, or were modified to exclude any dry forest OFSS areas from treatment. |

| | |
|---|---|
| 1) Some timber sale activities can occur within LOS stages that are within or above HRV in a manner to maintain or enhance LOS within that biophysical environment. It is allowable to manipulate one type of LOS to move stands into the LOS stage that is deficit if this meets historical conditions. | Dry forest OFMS is above HRV in the Sunflower Bacon Analysis Area. Many of the units proposed for treatment fall within dry forest OFMS stands. The proposed treatment for those units, thinning from below, would move those stands closer to OFSS conditions. Some stands proposed for treatment have a substantial understory component of noncommercial size. That understory component would remain largely intact following the timber sale treatment. Subsequent treatments proposed in the EA, i.e., prescribed fire and precommercial thinning, would remove a portion of the understory in some areas. Some stands would be expected to remain in the OFMS while others would move into OFSS. The stands remaining in OFMS would be expected to move into OFSS classification over time if additional prescribed fire or thinning treatments are implemented, or through natural mortality of the understory trees. Depending on stand conditions following harvest and the types and timing that might be selected for future treatments, the stands that are currently OFMS could move into OFSS classification in the next 10 to 20 years. |

| | |
|---|---|
| 2) Outside of LOS, many types of timber sale activities are allowed. The intent is still to maintain and/or enhance LOS components in stands subject to timber harvest as much as possible, by adhering to the following standards: | |
| a) Maintain all remnant late and old seral and/or structural live trees ≥ 21" dbh that currently exist within stands proposed for harvest activities. | As described in the EA, all live trees greater than or equal to 21 inches dbh would be left. |

| | |
|---|---|
| b) Manipulate vegetative structure that does not meet late and old structural (LOS) conditions, (as described in Table 1 of the Ecosystem Standard), in a manner that moves it towards these conditions as appropriate to meet HRV. | The prescription for the units outside of LOS is thinning from below. Thinning those stands would speed the development of OFSS conditions in those stands. This treatment would cut and remove many of the smaller trees within the stands and would save the larger, healthier trees. The effect would be to move the stands toward a single-stratum condition and would increase growth on the remaining trees so that they would grow to a large size more quickly. That combination of effects would enhance OFSS components of the stands. |
| c) Maintain open, parklike stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure. (While understory removal is allowed, some amount of seedlings, saplings, and poles need to be maintained for the development of future stands). | Dry forests in the Sunflower Bacon Analysis Area would have historically had a high percentage of OFSS stands. OFSS stands are often described as “open, parklike.” As described above, the proposed treatments maintain OFSS conditions or move stands toward OFSS conditions. |

| | |
|---|---|
| 3) Maintain connectivity and reduce fragmentation of LOS stands by adhering to the following standards:<br>INTENT STATEMENT: While data is still being collected, it is the best understanding of wildlife science, today, that wildlife species associated with late and old structural conditions, especially those sensitive to "edge", rely on the connectivity of these habitats to allow free movement and interaction of adults and dispersal of young. Connectivity corridors do not necessarily meet the same description of "suitable" habitat for breeding, but allow free movement between suitable breeding habitats. Until a full conservation assessment is completed that describes in more detail the movement patterns and needs of various species and communities of species in eastside ecosystems, it is important to insure that blocks of habitat maintain a high degree of connectivity between them, and that blocks of habitat do not become fragmented in the short-term. | Habitat connectivity was evaluated by overlaying maps of OFSS and OFMS stands, old growth stands designated by the Umatilla Forest Plan, management area C1; management areas C3 and E1; and timber harvest alternatives from the EA. During the planning stages of this project, it was discovered that there were no stands in the planning area that needed to be deleted to maintain habitat connectivity in the Analysis Area. Connectivity corridors between old forest habitat blocks and Forest Plan designated old growth were found to be maintained throughout the Sunflower Bacon Analysis Area. |

a) Maintain or enhance the current level of connectivity between LOS stands and between all Forest Plan designated "old growth/MR" habitats by maintaining stands between them that serve the purpose of connection as described below:

(1) Network pattern - LOS stands and MR/Old Growth habitats need to be connected with each other inside the watershed as well as to like stands in adjacent watersheds in a contiguous network pattern by at least 2 different directions.

(2) Connectivity Corridor Stand Description Stands in which medium diameter or larger trees are common, and canopy closures are within the top one-third of site potential. Stand widths should be at least 400 ft. wide at their narrowest point. The only exception to stand width is when it is impossible to meet 400 ft with current vegetative structure, AND these "narrower stands" are the only connections available; (use them as last resorts). In the case of lodgepole pine, consider medium to large trees as appropriate diameters to this stand type.

If stands meeting this description are not available in order to provide at least 2 different connections for a particular LOS stand or MR/Old Growth habitat, leave the next best stands for connections. Again, each LOS and MR/Old Growth habitat must be connected at least 2 different ways.

(3) Length of Connection Corridors - The length of corridors between LOS stands and MR habitats depends on the distance between such stands. Length of corridors should be as short as possible.

(4) Harvesting within connectivity corridors is permitted if all the criteria in (2) above can be met, and if some amount of understory (if any occurs) is left in patches or scattered to assist in supporting stand density and cover. Some understory removal, stocking control, or salvage may be possible activities, depending on the site.

a) To reduce fragmentation of LOS stands, or at least not increase it from current levels, stands that do not currently meet LOS that are located within, or surrounded by, blocks of LOS stands should not be considered for even-aged regeneration, or group selection at this time. Non-regeneration or single tree selection (UEAM) activities in these areas should only proceed if the prescription moves the stand towards LOS conditions as soon as possible.

| | |
|---|---|
| 4) Adhere to the following specific wildlife prescriptions. These standards are set at MINIMUM levels of consideration. Follow Forest Plan standards and guidelines when they EXCEED the following prescriptive levels: a) Snags, Green Tree Replacements and Down Logs:<br>INTENT STATEMENT - Most (if not all) wildlife species rely on moderate to high levels of snags and down logs for nesting, roosting, denning and feeding. Large down logs are a common and important component of most old and late structural forests. Past management practices have greatly reduced the number of large snags and down logs in managed stands. | |
| (1) All sale activities (including intermediate and regeneration harvest in both even-age and uneven-age systems, and salvage) will maintain snags and green replacement trees of > 21 inches dbh, (or whatever is the representative dbh of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators. This should be determined using the best available science on species requirements as applied through current snag models or other documented procedures. NOTE: for Scenario A, the live remnant trees (≥21" dbh) left can be considered for part of the green replacement tree requirement. | Under alternatives 2 through 4, all snags would be left unless they are safety hazards. The Sunflower Bacon EA states that at least 3 large snags per acre will be left to meet Forest Plan standards (as amended), in Units 56 and 57 where there will be at least 4 snags left per acre. These two stands suffered damage during the 2000/2001 tussock moth infestation. Snags will be grouped if possible. All green replacement trees over 21 inches dbh will be left. |

(2) Pre-activity (currently existing) down logs may be removed only when they exceed the quantities listed below. When pre-activity levels of down logs are below the quantities listed, do not remove downed logging debris that fits within the listed categories. It is not the intention of this direction to leave standing trees for future logs in addition to the required snag numbers, nor to fall merchantable material to meet the down log requirements. The snag numbers are designed to meet future down log needs in combination with natural mortality. Exceptions to meeting the down log requirement can be made where fire protection needs for life and property cannot be accomplished with this quantity of debris left on site.

The down log criteria are not intended to preclude the use of prescribed burning as an activity fuels modification treatment. Fire prescription parameters will ensure that consumption will not exceed 3 inches total (1 1/2 inch per side) of diameter reduction in the featured large logs (sizes below). Tools such as the CONSUME and FOFEM computer models, fire behavior nomograms, and local fire effects documentation can aid in diameter reduction estimates.

Leave logs in current lengths; do not cut them into pieces. Longer logs may count for multiple "pieces" without cutting them. Cutting them may destroy some habitat uses and also cause them to decay more rapidly. It is also not expected that the "pieces" left will be scattered equally across all acres.

| SPECIES | PCS. PER ACRE | DIA. SMALL END | PIECE LENGTH &TOTAL LINEAL LENGTH |
|---|---|---|---|
| Ponderosa Pine | 3-6 | 12" | >6 ft. 20-40 ft. |
| Mixed Conifer | 15-20 | 12" | >6 ft. 100-140 ft. |

The Sunflower Bacon EA includes mitigation that “Where possible, all pre-existing down material will be left and skidding will avoid existing downed logs to minimize breakage.”

| | |
|---|---|
| 5) GOSHAWKS:<br>INTENT STATEMENT: Goshawks are known to use interior forest habitats of mature/old growth structure. Habitat uses, nesting stand characteristics, and key habitat structural components in eastern Oregon/Washington are currently being studied. Until further information is known and management plans approved to insure species viability, the following standards are to be met as a minimum. Forest Plan standards and guidelines that EXCEED the levels described below should be used instead of, or in addition to the following:<br>(a) Protect every known active and historically used goshawk nest-site from disturbance. "Historical" refers to known nesting activity occurring at the site in the last 5 years. Seasonal restrictions on activities near nest sites will be required for activity types that may disturb or harass pair while bonding and nesting.<br>(b) 30 acres of the most suitable nesting habitat surrounding all active and historical nest tree(s) will be deferred from harvest.<br>c) A 400 acre "Post Fledging Area" (PFA) will be established around every known active nest site. While harvest activities can occur within this area, retain the LOS stands and enhance younger stands towards LOS condition, as possible. | There are no know Goshawk nests within the Analysis Area. |

# Appendix D – Roads Analysis

## Introduction

This process applies the 1999 USDA Roads Analysis procedure. This Roads Analysis follows the steps outlined in the 1999 USDA publication entitled--Roads Analysis: Informing decisions about managing the National Forest Transportation system.

An analysis of the Umatilla National Forest Road System was completed in January of 2004. Sunflower Bacon will be done at the project scale. This plan addresses 104 mile of road in the Sunflower Bacon analysis area. Forty-one miles of road will be maintained to haul approximately 15 CCF/ 7 MMBF of timber. The planning area will have one timber sale to be sold in 2006 or beyond.

The Sunflower Bacon EA is located on the Heppner Ranger District, Umatilla National Forest in T.6S. R.26E. Sections 1,12,13,14,23,24,25,26,35,36; T.6S. R.27E. Sections 7, 8, 16-22, 26-35; T.7S. R.26E. Sections 1, 12, 13; T.7S. R.27E, Sections 1-12,16-20; T.7S. R.28E. Sections 7; W.M.

The Sunflower Bacon Timber Haul route will appraise to flow northerly to State Highway 207, at Highway 207 the flow will go north to Heppner and then east on Highway 74 to the nearest milling point in Pilot Rock, Oregon.

## Current Situation

Most of the Sunflower Bacon drainage has been logged several times and many old roads and unclassified roads exist in the area. Most unclassified roads in the area have been reclaimed and are naturally decommissioned and there are no resource concerns.

The following road classification was used in the analysis.

Table 1. Road Classifications

| Functional Class | Maintenance Level Operational/Objective | Traffic Service Level | Service Life |
|---|---|---|---|
| Arterial: Provides service to large land areas. Connects with other arterials or public highways.<br>Collector: Serves smaller land areas than arterials. Connects arterials to local roads or terminal facilities.<br>Local: Connects terminal facilities with collectors or arterials. | Level 1<br>Closed more than 1 year.<br>Level 2<br>High-clearance vehicles.<br>Level 3<br>Passenger vehicles—surface not smooth.<br>Level 4<br>Passenger vehicles–smooth surface.<br>Level 5<br>Passenger vehicles–dust free; possibly paved. | A: Free flowing, mixed traffic; stable, smooth surface; provides safe service to all traffic.<br>B: Congested during heavy traffic, slower speeds and periodic dust; accommodates any legal-size load or vehicle.<br>C: Interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic or weather.<br>D: Flow is slow, may be blocked by management activities. Two-way traffic is difficult. Rough and irregular surface. Single purpose. | Constant:<br>Continuous or annual recurrent service<br>Intermittent:<br>Intermittent service. A road, which is closed to vehicle traffic between periods of use. The closed period must exceed one year.<br>Short Term:<br>Short Term use. |

## Transportation System

The transportation system on the Heppner Ranger District serves a variety of resource management and access needs. Most roads on the District were originally constructed for commercial purpose including timber, and grazing. Chronological road construction history within the analysis area correlated with timber harvest. Unclassified roads were not intended to be part of the National Forest road system. Unclassified roads are defined as roads that were built for temporary access for activates such as fire suppression and timber harvest or they existed as a result of recreational use where roads were created by that use. No unclassified roads were added to the system as the ones looked at with field reconnaissance were found to be grassed in and decommissioned.

The Sunflower Bacon project area contains 77 miles of local roads, 12 miles of collectors and the 11 miles of roads that would be arterials are county roads. There is also 4 miles of road that is on private and outside the Forest Service jurisdiction; these would all be classified as local road.

Table 2. Functional Classification and Map

| FUNCTIONAL CLASS | OBJECTIVE MAINTENANCE LEVEL | LENGTH (MI) |
|---|---|---|
| COUNTY ROAD | | 11 |
| PRIVATE | | 4 |
| C - COLLECTOR | 2 - HIGH CLEARANCE VEHICLES | 9 |
| C- COLLECTOR | 1 - BASIC CUSTODIAL CARE (CLOSED) | 3 |
| L - LOCAL | 2 - HIGH CLEARANCE VEHICLES | 60 |
| L - LOCAL | 1 - BASIC CUSTODIAL CARE (CLOSED) | 17 |

### Access and Travel Management

This area is constant with the Heppner Ranger District 1992 Access and Travel Management Plan, and future use needs. The following table compares Sunflower Bacon to the District open road density goal of 1.5 miles/square (Motorized Access and Travel Management Plan, page 36). Open in this comparison includes seasonally open roads, County roads and roads on private land.

Table 3. District Wide Roads

| ROADS | MILES | PERCENT | (Mi/Sq Mi) |
|---|---|---|---|
| Total Roads | 966 | | 2.9 |
| Roads Open | 516 | 53% | 1.5 |
| Roads Closed | 451 | 47% | 1.3 |

Table 4. Sunflower Bacon Roads

| | MILES | PERCENT | (Mi/SqMi) |
|---|---|---|---|
| Total Roads | 104 | | 3.0 |
| Roads Open | 44 | 42% | 1.3 |
| Roads Closed | 60 | 58% | 1.7 |

Access and Travel Management also stated that in Winter Range most roads should be closed either year long or seasonally during big game use period (December 1 through April 14) to reduce stress on big game during a time when the weather is harsher and food is scarce. Sunflower Bacon is a mix of primarily general forest and winter range. During winter range use period only 27% of the roads are available for travel and 73% are closed.

Table 5. Sunflower Bacon Roads in Winter Range

| | MILES | PERCENT | (Mi/Sq Mi) |
|---|---|---|---|
| Total Roads | 56 | | 3.0 |
| Roads Open | 15 | 27% | 0.8 |
| Roads Seasonally Open | 11 | 20% | 0.6 |
| Roads Closed | 30 | 53% | 1.6 |

ACCESS AND TRAVEL MANAGEMENT MAP

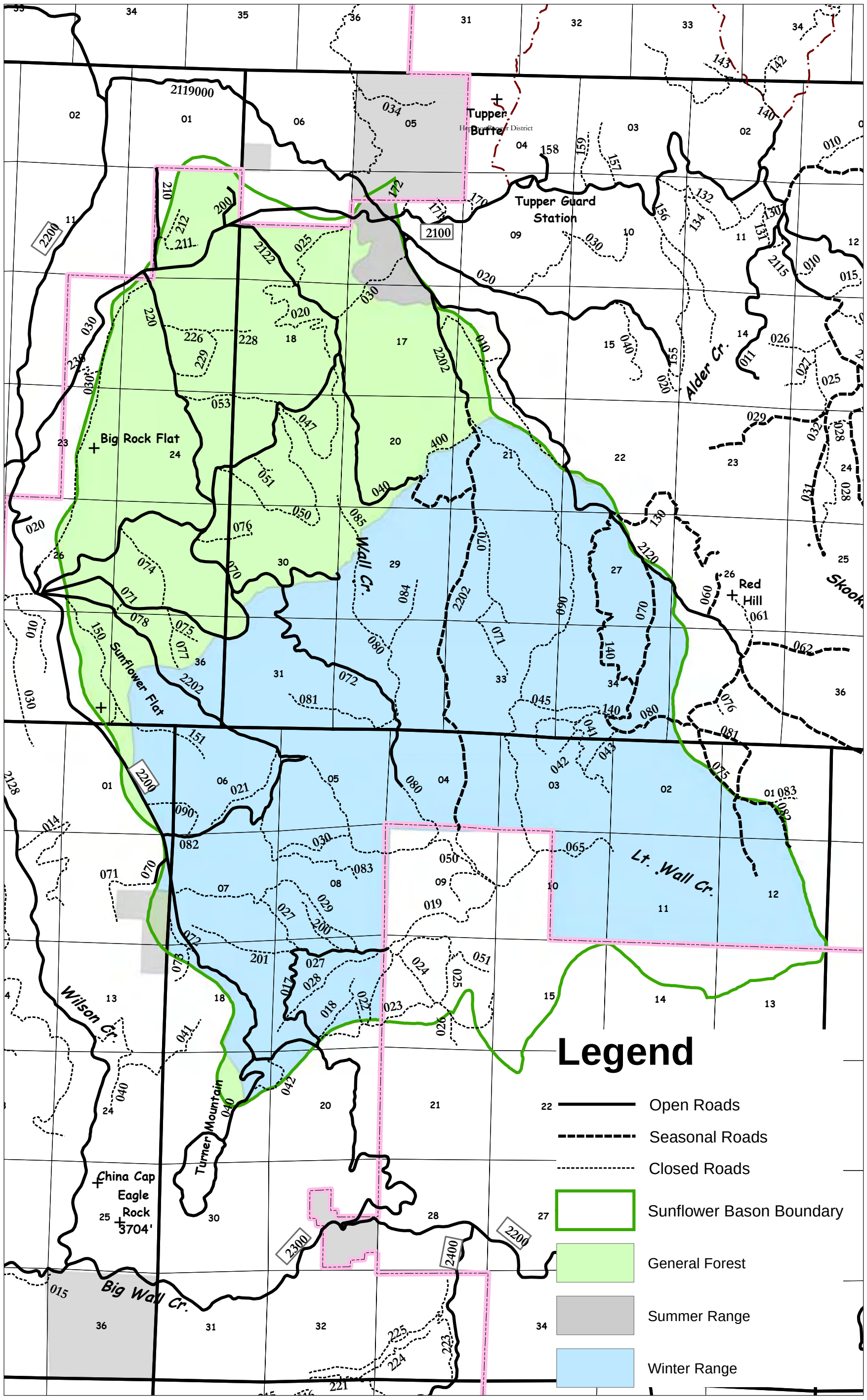


Figure 1. Access and Travel Management Map

## Proposed Road Access and Travel Management Changes

Road 2120070 is proposed to change from seasonally closed to closed year-round to reduce big game harassment during the hunting season in alternatives 3 and 4. The hunters in this area were scoped in October of 2004 during the last elk hunting season and no objections were noted (Rankin, 2004).

PROPOSED CLOSURE MAP

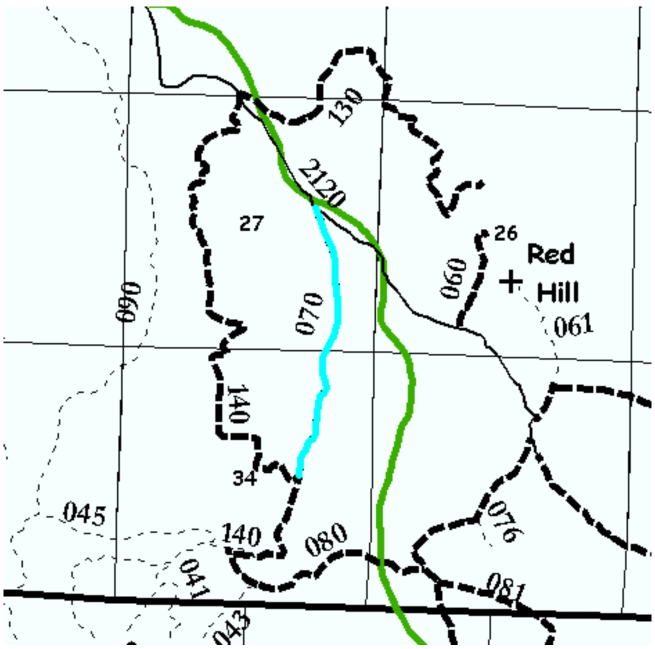


Figure 2. Road 2120070 Closure Map

Table 6. Proposed Change Sunflower Bacon Roads in Winter Range

| | EXISTING MILES | PROPOSED MILES | EXISTING (Mi/Sq Mi) | PROPOSED (Mi/Sq Mi) |
|---|---|---|---|---|
| Total Roads | 56 | 56 | 3.0 | 3.0 |
| Roads Open | 15 | 15 | 0.8 | 0.8 |
| Roads Seasonally Open | 11 | 10 | 0.6 | 0.5 |
| Roads Closed | 30 | 31 | 1.6 | 1.7 |

## *Values vs. Risk*

To assess the problems and risks posed by the current road system, the IDT evaluated the primary transportation system in the Sunflower Bacon area using the following tools: a GIS assessment, a road matrix, and a road management graph.

### GIS Assessment

The effect of roads on the watershed and aquatic resources was analyzed using GIS computer technology combined with the Forest transportation inventory and cartographic feature files.

### Road Event Layer

This is a layer using the management direction for each road. The roads may be segmented by management criteria. Private and County roads are not rated as we do not have management authority for them.

### The Road Matrix

The matrix assigns low, medium, or high values to resources, and includes annual and deferred maintenance costs. This is a broad assessment, so the detail and accuracy for road risk and values contain a degree of subjectivity and potential for inaccuracies. However, this road matrix provides road-specific information that will help identify roads that pose high risk to other resources. It categorizes the values and risks of the current road system and helps identify opportunities.

### The Road Management Graph

The graph developed to display the information in the road matrix. It categorizes the values and risks of the current road system and helps identify opportunities for managing the road system. This graph is only a management guide.

The risks and values from the road matrix and the road management map are defined below.

## *Road Related Values*

### Recreation Use Values

High values were assigned to roads that are open yearlong or provided direct access to developed recreation sites or private land. Medium values were assigned to road seasonally open. Low values were assigned to roads that are closed.

### Resource Management Values

High values were assigned to open road segments that access suitable timber base or range improvements. Medium values were assigned to road segments that are closed but access timber base or range improvements or open roads not accessing timber land. Low values were assigned to road segments closed with little timber base or range use.

## Fire Management Values

High values were assigned to open road segments that would assist in quick fire suppression efforts. Medium values were assigned to road segments that are closed but could be used for suppression. Low was assigned to road segments closed in stream channels that would not be used or as a last resort.

## Road Engineering Values

There were two ratings given for the engineering values. The first criteria were based on investment in the road surfacing. High values were given to roads with an aggregate surface. Medium values were given to roads improved with pitrun. Low values were assigned to roads with no rock improvement. The second criteria used were based on maintenance levels. No High values were given as all the open roads in this area are a maintenance level 2 which do not see annual maintenance. A Medium value was given to open maintenance level 2 roads; they are minimally maintained, mostly by users and occasionally with Forest road maintenance dollars when available. A Low value was given to closed roads as they are not maintained.

## Road Related Risk

### Watershed

Watershed risk was evaluated using the average of three criteria.

- Road crossing the stream channels: High risks were assigned to roads that have segments crossing class 1 or 2 streams. Medium risks were assigned to roads that have segments crossing class 3 streams. Low risks were assigned to roads that have segments crossing class 4 streams.
- Road within the stream buffers: High risks were assigned to roads within 300 feet of class 1 or 2 streams or any passage problems. Medium risks were assigned to roads within 150 feet of 3 streams. Low risks were assigned to roads that are within 150 feet of class 4 streams.
- Roads were rated with the GIS Soil Resource Inventory layer using the cutbank and ditch erosion potential. This interpretation indicated the potential for subsoil erosion by running water of each soil. The roads were clipped to show what lies within the existing High, Medium and low erosion potential soils. Several soil types underlying each segment of road. The road segment was rated by the prevalent soil type in that segment.

### Wildlife Species

High risks were assigned to road segments were open yearlong to travel in winter range. Medium risks were assigned to road segments open seasonally in winter range. Low risks were assigned to roads closed yearlong.

### Invasive Plant Species

Noxious Weeds is considered a high priority on the district.  The noxious weed layer was intersected with the roads layer.  Only two ratings were given.  High risk was given to any road segment intersecting a known noxious weed site.  Low risk was given to all the other roads.

## Road Risk / Value Categories

After performing a road-by-road rating of risk and value based on the established criteria, the following road management categories and map was developed to display the information and present opportunities for road management.

### Road Management Categories and Graph

The following four categories of roads were identified based on value and risk.  Within each category, there are possible management options for the roads.

*Category 1: High Value Low Risk – Stable Condition*

- Consider road maintenance funds on these roads to keep them in this category.
- Low Resource Concerns
- These roads form part of the potential minimum road system for the Forest.

*Category 2: High Value and High Risk – Priorities for Capital Improvements*

- Consider  opportunities to reduce high risks
- Consider road improvement or capital improvement would reduce risk.
- Consider closing to reduce risk.

*Category 3: Low Risk and High Value – Priority for Action to Reduce Action*

- Consider closing or seasonally closing to reduce risk
- High potential for decommissioning, obliteration or improving value to reduce risk.

*Category 4: Low Value and Low Risk – Stable Condition*

- Lowest priority for expending annual road maintenance funding.
- Moderate potential for reducing maintenance level and/or functional classification.

Table 7. Road Risk-Value Graph

| | | |
|---|---|---|
| Risk | **Category 2**<br>HIGH VALUE / HIGH RISK<br>23 Miles - 22%<br>Review Resource Concerns<br>Priority for Investment | **Category 3**<br>LOW VALUE / HIGH RISK<br>30 Miles - 30%<br>Review Resource Concerns<br>Consider Closing/Decommissioning |
| Value | **Category 1**<br>HIGH VALUE / LOW RISK<br>4 Miles - 4%<br>Good Condition | **Category 4**<br>LOW VALUE / LOW RISK<br>35 Miles - 33%<br>Stable Condition |

*Note: 12 miles - 11 % of the roads were not rated as they are outside the Forest Service jurisdiction.*

## *Transportation for Timber Sale*

The following is the proposed transportation system for the timber sale by alternative. The roads in the planning area are currently in place and no new roads will be constructed. The thirty three miles of roads are adequate for timber haul with just road maintenance work. Road maintenance work includes prehaul and post haul blading, removal and replacement of earth barricade, cleaning of culverts and ditches, and brushing of smaller than 6" reproduction and log out of down trees as necessary. Roads 22, 21 and 2120 are County roads and the responsibility of the Morrow and Wheeler County for maintenance.

Reconstruction will be done on eight miles roads to improve drainage and harden roadbeds for haul. Reconstruction is work that is outside the scope of maintenance specifications or that requires additional engineering drawings or design. The reconstruction is occurring on low standard roads not for passenger car travel. These roads are reconstructed to accommodate timber haul. Tables 1 and 2 are a list of the roads used in the Timber Sales for the different alternatives with a brief description of maintenance or reconstruction work required for each road.

There only change between alternatives is in Alternative 3, 1 miles of maintenance on the 2202 will not be necessary due to the units dropped.

Table 8. Summary of Alternatives

| Alternative | Miles Road Maintenance | Miles Road Reconstruction | Miles Closed Road Used. |
|---|---|---|---|
| No Action Alternative 1 | 0 | 0 | 0 |
| Alternative 2 | 33 | 8 | 16 |
| Alternative 3 | 32 | 8 | 16 |
| Alternative 4 | 33 | 8 | 16 |

# Appendix E – Existing and Predicted Detrimental Soil Condition (DSC)

| Alternative 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | SRI |
| | | | | | | | | | | | | | | | | |
| 3 | 23 | 7% | 1.6 | 6.0% | 1.4 | 2.0% | 0.5 | | | | | 0% | 0.0 | 15% | 3.5 | 01, 02, 21 |
| 4** | 9 | 7% | 0.63 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.00 | 15% | 1.4 | 21 |
| 5** | 15 | 7% | 1.05 | 6.0% | 0.9 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.3 | 21, 91 |
| 6 | 19 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.9 | 01, 21 |
| 7 | 35 | 7% | 2.5 | 6.0% | 2.1 | 2.0% | 0.7 | | | | | 0% | 0.0 | 15% | 5.3 | 01, 21 |
| 8 | 33 | 7% | 2.3 | 6.0% | 2.0 | 2.0% | 0.7 | | | | | 0% | 0.0 | 15% | 5.0 | 01, 03, 23 |
| 9 | 27 | 7% | 1.9 | 6.0% | 1.6 | 2.0% | 0.5 | | | | | 0% | 0.0 | 15% | 4.1 | 01, 21 |
| 10 | 24 | 7% | 1.7 | 4.5% | 1.1 | 2.0% | 0.5 | | | | | 0% | 0.0 | 14% | 3.2 | 01, 03, 21, 23 |
| 11 | 47 | 17% | 8.0 | 6.0% | 2.8 | 2.0% | 0.9 | | | | | 5% | 2.4 | 20% | 9.4 | 01, 21 |
| 13 | 21 | 7% | 1.5 | 4.5% | 0.9 | 2.0% | 0.4 | | | 100% | 0.07 | 0% | 0.0 | 14% | 2.9 | 03, 21 |
| 14 | 67 | 17% | 11.4 | 6.0% | 4.0 | 2.0% | 1.3 | | | | | 5% | 3.4 | 20% | 13.4 | 01, 21, 22, 23, 24, 91 |
| 15 | 19 | 27% | 5.1 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 15% | 2.9 | 20% | 3.8 | 03, 22, 23 |
| 16** | 12 | 7% | 0.84 | 6.0% | 0.7 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.8 | 03, 21 |
| 17 | 167 | 7% | 11.7 | 6.0% | 10.0 | 2.0% | 3.3 | | | | | 0% | 0.0 | 15% | 25.1 | 01, 03, 04, 21, 22, 24, 91 |
| 18** | 4 | 7% | 0.28 | 6.0% | 0.2 | 2.0% | 0.1 | | | | | 0% | 0.0 | 15% | 0.6 | 03, 21 |
| 20 | 82 | 7% | 5.7 | 6.0% | 4.9 | 2.0% | 1.6 | | | | | 0% | 0.0 | 15% | 12.3 | 03, 21, 24 |
| 22 | 38 | 7% | 2.7 | 6.0% | 2.3 | 2.0% | 0.8 | | | | | 0% | 0.0 | 15% | 5.7 | 03, 21 |
| 23 | 115 | 7% | 8.1 | 6.0% | 6.9 | 2.0% | 2.3 | | | | | 0% | 0.0 | 15% | 17.3 | 03, 21, 22, 24 |
| 24 | 5 | 7% | 0 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 0% | 0.0 | 8% | 0.4 | 03, 21 |
| 27 | 41 | 7% | 2.9 | 6.0% | 2.5 | 2.0% | 0.8 | | | | | 0% | 0.0 | 15% | 6.2 | 01, 03, 23 |
| 28 | 11 | 7% | 0.8 | 6.0% | 0.7 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.7 | 03, 24 |
| 29 | 36 | 7% | 0 | 6.0% | 2.2 | 2.0% | 0.7 | | | | | 0% | 0.0 | 8% | 2.9 | 01, 23 |
| 30 | 18 | 7% | 0 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 8% | 1.4 | 03, 24 |

| Alternative 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | SRI |
| 31** | 10 | 7% | 0.70 | 6.0% | 0.6 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.5 | 24, 91 |
| 32** | 5 | 7% | 0.35 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 0% | 0.0 | 15% | 0.8 | 03, 24, 91 |
| 33 | 18 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | 100% | 0.4 | | | 0% | 0.0 | 17% | 3.1 | 03, 24, 91 |
| 34 | 9 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.4 | 01, 91 |
| 35 | 44 | 7% | 3.1 | 6.0% | 2.6 | 2.0% | 0.9 | | | | | 0% | 0.0 | 15% | 6.6 | 03, 21, 22, 24, 91 |
| 36 | 17 | 7% | 1.2 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.6 | 22, 23, 24 |
| 37 | 8 | 7% | 0 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 8% | 0.6 | 23 |
| 38 | 115 | 7% | 8.1 | 6.0% | 6.9 | 2.0% | 2.3 | 100% | 1.5 | | | 0% | 0.0 | 16% | 18.8 | 03, 21, 23, 24, |
| 39 | 30 | 7% | 2.1 | 4.5% | 1.4 | 2.0% | 0.6 | | | | | 0% | 0.0 | 14% | 4.1 | 03, 21, 23 |
| 40 | 9 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.4 | 03, 21 |
| 41 | 3 | 7% | 0.2 | 4.5% | 0.1 | 2.0% | 0.1 | | | | | 0% | 0.0 | 14% | 0.4 | 2121214 |
| 42 | 15 | 7% | 1.1 | 4.5% | 0.7 | 2.0% | 0.3 | | | | | 0% | 0.0 | 14% | 2.0 | 03, 21, 23 |
| 43 | 29 | 7% | 2.0 | 4.5% | 1.3 | 2.5% | 0.7 | | | 100% | 0.22 | 0% | 0.0 | 15% | 4.3 | 03, 21 |
| 44 | 9 | 7% | 0 | 4.5% | 0.4 | 2.0% | 0.2 | | | | | 0% | 0.0 | 7% | 0.6 | 03, 21 |
| 45 | 28 | 7% | 2.0 | 4.5% | 1.3 | 2.0% | 0.6 | | | | | 0% | 0.0 | 14% | 3.8 | 21, 23, |
| 47 | 19 | 17% | 3.2 | 6.0% | 1.1 | 2.0% | 0.4 | 100% | 1.4 | | | 12% | 2.3 | 20% | 3.8 | 03, 21 |
| 48 | 27 | 7% | 1.9 | 6.0% | 1.6 | 2.0% | 0.5 | 100% | 0.6 | | | 0% | 0.0 | 17% | 4.6 | 01, 21, 22, 23, 31 |
| 49 | 13 | 7% | 0.9 | 6.0% | 0.8 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.0 | 03, 22, 23 |
| 50 | 18 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.7 | 01, 02, 03, 21 |
| 52 | 28 | 7% | 2.0 | 4.5% | 1.3 | 2.5% | 0.7 | | | 100% | 0.37 | 0% | 0.0 | 15% | 4.3 | 03, 24 |
| 53 | 15 | 7% | 0 | 4.5% | 0.7 | 2.0% | 0.3 | | | | | 0% | 0.0 | 7% | 1.0 | 2323414 |
| 54 | 19 | 7% | 0 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 8% | 1.5 | 03, 23 |
| 55 | 30 | 7% | 2.1 | 6.0% | 1.8 | 2.0% | 0.6 | | | | | 0% | 0.0 | 15% | 4.5 | 2323414 |
| 56 | 151 | 7% | 10.6 | 4.5% | 6.8 | 2.0% | 3.0 | | | | | 0% | 0.0 | 14% | 20.4 | 03, 21, 22 |
| 57 | 32 | 7% | 2.2 | 4.5% | 1.4 | 2.0% | 0.6 | | | | | 0% | 0.0 | 14% | 4.3 | 03, 21, 91 |
| 59 | 22 | 7% | 1.5 | 6.0% | 1.3 | 2.0% | 0.4 | 100% | 0.2 | | | 0% | 0.0 | 16% | 3.5 | 01, 21 |
| 61 | 19 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.9 | 2323414 |

| Alternative 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | SRI |
| 62 | 78 | 7% | 5.5 | 4.5% | 3.5 | 2.0% | 1.6 | | | | | 0% | 0.0 | 14% | 10.5 | 03, 21, 23 |
| 63 | 14 | 7% | 0 | 4.5% | 0.6 | 2.0% | 0.3 | 100% | 0.3 | | | 0% | 0.0 | 9% | 1.2 | 01, 23 |
| 64 | 19 | 7% | 0 | 4.5% | 0.9 | 2.0% | 0.4 | 100% | 0.3 | | | 0% | 0.0 | 8% | 1.5 | 03, 23 |
| 65 | 31 | 7% | 2.2 | 4.5% | 1.4 | 2.0% | 0.6 | 100% | 0.3 | | | 0% | 0.0 | 14% | 4.5 | 01, 03, 23 |
| 66 | 4 | 7% | 0.3 | 6.0% | 0.2 | 2.0% | 0.1 | 100% | 0.5 | | | 6% | 0.3 | 20% | 0.8 | 2323414 |
| 67 | 8 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.2 | 01, 23 |
| 68 | 15 | 7% | 1.1 | 6.0% | 0.9 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.3 | 01, 02, 23 |
| 70 | 9 | 17% | 1.5 | 6.0% | 0.5 | 2.0% | 0.2 | 100% | 0.6 | | | 11% | 1.0 | 20% | 1.8 | 01, 24 |
| 71 | 5 | 17% | 0.9 | 6.0% | 0.3 | 2.0% | 0.1 | 100% | 0.6 | | | 16% | 0.8 | 20% | 1.0 | 05, 24 |
| 72 | 21 | 7% | 1.5 | 6.0% | 1.3 | 2.5% | 0.5 | | | 100% | 0.23 | 0% | 0.0 | 17% | 3.5 | 01, 03, 23 |
| 73 | 21 | 17% | 3.6 | 6.0% | 1.3 | 2.5% | 0.5 | | | 100% | 0.17 | 6% | 1.3 | 20% | 4.2 | 23, 91 |
| 74 | 52 | 17% | 8.8 | 6.0% | 3.1 | 2.5% | 1.3 | 100% | 1.9 | 100% | 0.20 | 10% | 5.0 | 20% | 10.4 | 03, 23, 91 |
| 75** | 19 | 7% | 1.33 | 4.5% | 0.9 | 2.5% | 0.5 | | | | | 0% | 0.0 | 14% | 2.7 | 03, 21, 23 |
| 77 | 15 | 17% | 2.6 | 4.5% | 0.7 | 2.5% | 0.4 | | | | | 4% | 0.6 | 20% | 3.0 | 22, 23, 91 |
| 79 | 36 | 7% | 2.5 | 4.5% | 1.6 | 2.5% | 0.9 | | | 100% | 0.42 | 0% | 0.0 | 15% | 5.5 | 03, 21 |
| 80** | 11 | 7% | 0.77 | 4.5% | 0.5 | 2.5% | 0.3 | | | 100% | 0.27 | 0% | 0.0 | 16% | 1.8 | 21, 22 |
| 81 | 17 | 7% | 1.2 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.6 | 03, 21 |
| 82 | 5 | 17% | 0.9 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 5% | 0.3 | 20% | 1.0 | 03, 21 |
| 83 | 35 | 7% | 2.5 | 4.5% | 1.6 | 2.0% | 0.7 | 100% | 0.6 | | | 0% | 0.0 | 15% | 5.3 | 03, 21, 21212 |
| 84 | 23 | 7% | 1.6 | 4.5% | 1.0 | 2.0% | 0.5 | | | | | 0% | 0.0 | 14% | 3.1 | 03, 21 |
| 85 | 12 | 7% | 0.8 | 4.5% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 14% | 1.6 | 21, 23 |
| 86 | 138 | 17% | 23.5 | 6.0% | 8.3 | 2.0% | 2.8 | | | | | 5% | 6.9 | 20% | 27.6 | 01, 21, 23, 69 |
| 90 | 8 | 7% | 0.6 | 4.5% | 0.4 | 2.0% | 0.2 | 100% | 0.2 | | | 0% | 0.0 | 16% | 1.3 | 21 |
| 91 | 16 | 7% | 1.1 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.4 | 21 |
| 92 | 120 | 7% | 0 | 6.0% | 7.2 | 2.0% | 2.4 | | | 100% | 0.30 | 0% | 0.0 | 8% | 9.9 | 03, 21 |
| 93 | 13 | 7% | 0.9 | 4.5% | 0.6 | 2.0% | 0.3 | | | | | 0% | 0.0 | 14% | 1.8 | 03, 21 |
| 95 | 16 | 7% | 1.1 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.4 | 22, 23 |
| 96 | 75 | 7% | 5.3 | 6.0% | 4.5 | 2.0% | 1.5 | 100% | 0.9 | | | 0% | 0.0 | 16% | 12.1 | 03, 22, 23, 24 |

| Alternative 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | SRI |
| TOTAL | 2446 | | 194 | | 136 | | 50 | | 10 | | 2.25 | | 27 | | 366 | |

| Alternative 3 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| 3 | 23 | 7% | 1.6 | 6.0% | 1.4 | 2.0% | 0.5 | | | | | 0% | 0.0 | 15% | 3.5 | 01, 02, 21 |
| 4** | 9 | 7% | 0.63 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.00 | 15% | 1.4 | 21 |
| 5** | 15 | 7% | 1.05 | 6.0% | 0.9 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.3 | 21, 91 |
| 6 | 19 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.9 | 01, 21 |
| 7 | 35 | 7% | 2.5 | 6.0% | 2.1 | 2.0% | 0.7 | | | | | 0% | 0.0 | 15% | 5.3 | 01, 21 |
| 8 | 33 | 7% | 2.3 | 6.0% | 2.0 | 2.0% | 0.7 | | | | | 0% | 0.0 | 15% | 5.0 | 01, 03, 23 |
| 9 | 27 | 7% | 1.9 | 6.0% | 1.6 | 2.0% | 0.5 | | | | | 0% | 0.0 | 15% | 4.1 | 01, 21 |
| 10 | 24 | 7% | 1.7 | 4.5% | 1.1 | 2.0% | 0.5 | | | | | 0% | 0.0 | 14% | 3.2 | 01, 03, 21, 23 |
| 11 | 47 | 17% | 8.0 | 6.0% | 2.8 | 2.0% | 0.9 | | | | | 5% | 2.4 | 20% | 9.4 | 01, 21 |
| 13 | 21 | 7% | 1.5 | 4.5% | 0.9 | 2.0% | 0.4 | | | 100% | 0.07 | 0% | 0.0 | 14% | 2.9 | 03, 21 |
| 16** | 12 | 7% | 0.84 | 6.0% | 0.7 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.8 | 03, 21 |
| 18** | 4 | 7% | 0.28 | 6.0% | 0.2 | 2.0% | 0.1 | | | | | 0% | 0.0 | 15% | 0.6 | 03, 21 |
| 20 | 82 | 7% | 5.7 | 6.0% | 4.9 | 2.0% | 1.6 | | | | | 0% | 0.0 | 15% | 12.3 | 03, 21, 24 |
| 22 | 38 | 7% | 2.7 | 6.0% | 2.3 | 2.0% | 0.8 | | | | | 0% | 0.0 | 15% | 5.7 | 03, 21 |
| 24 | 5 | 7% | 0 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 0% | 0.0 | 8% | 0.4 | 03, 21 |
| 27 | 41 | 7% | 2.9 | 6.0% | 2.5 | 2.0% | 0.8 | | | | | 0% | 0.0 | 15% | 6.2 | 01, 03, 23 |
| 29 | 36 | 7% | 0 | 6.0% | 2.2 | 2.0% | 0.7 | | | | | 0% | 0.0 | 8% | 2.9 | 01, 23 |
| 31** | 10 | 7% | 0.70 | 6.0% | 0.6 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.5 | 24, 91 |
| 32** | 5 | 7% | 0.35 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 0% | 0.0 | 15% | 0.8 | 03, 24, 91 |
| 33 | 18 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | 100% | 0.4 | | | 0% | 0.0 | 17% | 3.1 | 03, 24, 91 |
| 34 | 9 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.4 | 01, 91 |
| 35 | 44 | 7% | 3.1 | 6.0% | 2.6 | 2.0% | 0.9 | | | | | 0% | 0.0 | 15% | 6.6 | 03, 21, 22, 24, 91 |

| Alternative 3 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| 36 | 17 | 7% | 1.2 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.6 | 22, 23, 24 |
| 40 | 9 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.4 | 03, 21 |
| 42 | 15 | 7% | 1.1 | 4.5% | 0.7 | 2.0% | 0.3 | | | | | 0% | 0.0 | 14% | 2.0 | 03, 21, 23 |
| 43 | 29 | 7% | 2.0 | 4.5% | 1.3 | 2.5% | 0.7 | | | 100% | 0.22 | 0% | 0.0 | 15% | 4.3 | 03, 21 |
| 44 | 9 | 7% | 0 | 4.5% | 0.4 | 2.0% | 0.2 | | | | | 0% | 0.0 | 7% | 0.6 | 03, 21 |
| 47 | 19 | 17% | 3.2 | 6.0% | 1.1 | 2.0% | 0.4 | 100% | 1.4 | | | 12% | 2.3 | 20% | 3.8 | 03, 21 |
| 48 | 27 | 7% | 1.9 | 6.0% | 1.6 | 2.0% | 0.5 | 100% | 0.6 | | | 0% | 0.0 | 17% | 4.6 | 01, 21, 22, 23, 31 |
| 49 | 13 | 7% | 0.9 | 6.0% | 0.8 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.0 | 03, 22, 23 |
| 50 | 18 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.7 | 01, 02, 03, 21 |
| 52 | 28 | 7% | 2.0 | 4.5% | 1.3 | 2.5% | 0.7 | | | 100% | 0.37 | 0% | 0.0 | 15% | 4.3 | 03, 24 |
| 53 | 15 | 7% | 0 | 4.5% | 0.7 | 2.0% | 0.3 | | | | | 0% | 0.0 | 7% | 1.0 | 2323414 |
| 55 | 30 | 7% | 2.1 | 6.0% | 1.8 | 2.0% | 0.6 | | | | | 0% | 0.0 | 15% | 4.5 | 2323414 |
| 56 | 151 | 7% | 10.6 | 4.5% | 6.8 | 2.0% | 3.0 | | | | | 0% | 0.0 | 14% | 20.4 | 03, 21, 22 |
| 57 | 32 | 7% | 2.2 | 4.5% | 1.4 | 2.0% | 0.6 | | | | | 0% | 0.0 | 14% | 4.3 | 03, 21, 91 |
| 59 | 22 | 7% | 1.5 | 6.0% | 1.3 | 2.0% | 0.4 | 100% | 0.2 | | | 0% | 0.0 | 16% | 3.5 | 01, 21 |
| 61 | 19 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.9 | 2323414 |
| 62 | 78 | 7% | 5.5 | 4.5% | 3.5 | 2.0% | 1.6 | | | | | 0% | 0.0 | 14% | 10.5 | 03, 21, 23 |
| 63 | 14 | 7% | 0 | 4.5% | 0.6 | 2.0% | 0.3 | 100% | 0.3 | | | 0% | 0.0 | 9% | 1.2 | 01, 23 |
| 64 | 19 | 7% | 0 | 4.5% | 0.9 | 2.0% | 0.4 | 100% | 0.3 | | | 0% | 0.0 | 8% | 1.5 | 03, 23 |
| 65 | 31 | 7% | 2.2 | 4.5% | 1.4 | 2.0% | 0.6 | 100% | 0.3 | | | 0% | 0.0 | 14% | 4.5 | 01, 03, 23 |
| 67 | 8 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.2 | 01, 23 |
| 68 | 15 | 7% | 1.1 | 6.0% | 0.9 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.3 | 01, 02, 23 |
| 70 | 9 | 17% | 1.5 | 6.0% | 0.5 | 2.0% | 0.2 | 100% | 0.6 | | | 11% | 1.0 | 20% | 1.8 | 01, 24 |
| 71 | 5 | 17% | 0.9 | 6.0% | 0.3 | 2.0% | 0.1 | 100% | 0.6 | | | 16% | 0.8 | 20% | 1.0 | 05, 24 |
| 72 | 21 | 7% | 1.5 | 6.0% | 1.3 | 2.5% | 0.5 | | | 100% | 0.23 | 0% | 0.0 | 17% | 3.5 | 01, 03, 23 |
| 75** | 19 | 7% | 1.33 | 4.5% | 0.9 | 2.5% | 0.5 | | | | | 0% | 0.0 | 14% | 2.7 | 03, 21, 23 |
| 77 | 15 | 17% | 2.6 | 4.5% | 0.7 | 2.5% | 0.4 | | | | | 4% | 0.6 | 20% | 3.0 | 22, 23, 91 |
| 79 | 36 | 7% | 2.5 | 4.5% | 1.6 | 2.5% | 0.9 | | | 100% | 0.42 | 0% | 0.0 | 15% | 5.5 | 03, 21 |
| 80** | 11 | 7% | 0.77 | 4.5% | 0.5 | 2.5% | 0.3 | | | 100% | 0.27 | 0% | 0.0 | 16% | 1.8 | 21, 22 |

| Alternative 3 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| 82 | 5 | 17% | 0.9 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 5% | 0.3 | 20% | 1.0 | 03, 21 |
| 84 | 23 | 7% | 1.6 | 4.5% | 1.0 | 2.0% | 0.5 | | | | | 0% | 0.0 | 14% | 3.1 | 03, 21 |
| 85 | 12 | 7% | 0.8 | 4.5% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 14% | 1.6 | 21, 23 |
| 86 | 138 | 17% | 23.5 | 6.0% | 8.3 | 2.0% | 2.8 | | | | | 5% | 6.9 | 20% | 27.6 | 01, 21, 23, 69 |
| 91 | 16 | 7% | 1.1 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.4 | 21 |
| 95 | 16 | 7% | 1.1 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.4 | 22, 23 |
| 96 | 75 | 7% | 5.3 | 6.0% | 4.5 | 2.0% | 1.5 | 100% | 0.9 | | | 0% | 0.0 | 16% | 12.1 | 03, 22, 23, 24 |
| Total | | | 127 | | 86 | | 32 | | 5 | | 1.58 | | 14 | | 238 | |

| Alternative 4 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| 3 | 23 | 7% | 1.6 | 6.0% | 1.4 | 2.0% | 0.5 | | | | | 0% | 0.0 | 15% | 3.5 | 01, 02, 21 |
| 4** | 9 | 7% | 0.63 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.00 | 15% | 1.4 | 21 |
| 5** | 15 | 7% | 1.05 | 6.0% | 0.9 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.3 | 21, 91 |
| 6 | 19 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.9 | 01, 21 |
| 7 | 35 | 7% | 2.5 | 6.0% | 2.1 | 2.0% | 0.7 | | | | | 0% | 0.0 | 15% | 5.3 | 01, 21 |
| 8 | 33 | 7% | 2.3 | 6.0% | 2.0 | 2.0% | 0.7 | | | | | 0% | 0.0 | 15% | 5.0 | 01, 03, 23 |
| 9 | 27 | 7% | 1.9 | 6.0% | 1.6 | 2.0% | 0.5 | | | | | 0% | 0.0 | 15% | 4.1 | 01, 21 |
| 10 | 24 | 7% | 1.7 | 4.5% | 1.1 | 2.0% | 0.5 | | | | | 0% | 0.0 | 14% | 3.2 | 01, 03, 21, 23 |
| 11 | 47 | 17% | 8.0 | 6.0% | 2.8 | 2.0% | 0.9 | | | | | 5% | 2.4 | 20% | 9.4 | 01, 21 |
| 13 | 21 | 7% | 1.5 | 4.5% | 0.9 | 2.0% | 0.4 | | | 100% | 0.07 | 0% | 0.0 | 14% | 2.9 | 03, 21 |
| 14 | 67 | 17% | 11.4 | 6.0% | 4.0 | 2.0% | 1.3 | | | | | 5% | 3.4 | 20% | 13.4 | 01, 21, 22, 23, 24, 91 |
| 16** | 12 | 7% | 0.84 | 6.0% | 0.7 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.8 | 03, 21 |
| 18** | 4 | 7% | 0.28 | 6.0% | 0.2 | 2.0% | 0.1 | | | | | 0% | 0.0 | 15% | 0.6 | 03, 21 |
| 20 | 82 | 7% | 5.7 | 6.0% | 4.9 | 2.0% | 1.6 | | | | | 0% | 0.0 | 15% | 12.3 | 03, 21, 24 |

| Alternative 4 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| 22 | 38 | 7% | 2.7 | 6.0% | 2.3 | 2.0% | 0.8 | | | | | 0% | 0.0 | 15% | 5.7 | 03, 21 |
| 23 | 115 | 7% | 8.1 | 6.0% | 6.9 | 2.0% | 2.3 | | | | | 0% | 0.0 | 15% | 17.3 | 03, 21, 22, 24 |
| 24 | 5 | 7% | 0 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 0% | 0.0 | 8% | 0.4 | 03, 21 |
| 27 | 41 | 7% | 2.9 | 6.0% | 2.5 | 2.0% | 0.8 | | | | | 0% | 0.0 | 15% | 6.2 | 01, 03, 23 |
| 29 | 36 | 7% | 0 | 6.0% | 2.2 | 2.0% | 0.7 | | | | | 0% | 0.0 | 8% | 2.9 | 01, 23 |
| 30 | 18 | 7% | 0 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 8% | 1.4 | 03, 24 |
| 31** | 10 | 7% | 0.70 | 6.0% | 0.6 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.5 | 24, 91 |
| 32** | 5 | 7% | 0.35 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 0% | 0.0 | 15% | 0.8 | 03, 24, 91 |
| 33 | 18 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | 100% | 0.4 | | | 0% | 0.0 | 17% | 3.1 | 03, 24, 91 |
| 34 | 9 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.4 | 01, 91 |
| 35 | 44 | 7% | 3.1 | 6.0% | 2.6 | 2.0% | 0.9 | | | | | 0% | 0.0 | 15% | 6.6 | 03, 21, 22, 24, 91 |
| 36 | 17 | 7% | 1.2 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.6 | 22, 23, 24 |
| 37 | 8 | 7% | 0 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 8% | 0.6 | 23 |
| 38 | 115 | 7% | 8.1 | 6.0% | 6.9 | 2.0% | 2.3 | 100% | 1.5 | | | 0% | 0.0 | 16% | 18.8 | 03, 21, 23, 24, |
| 40 | 9 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.4 | 03, 21 |
| 42 | 15 | 7% | 1.1 | 4.5% | 0.7 | 2.0% | 0.3 | | | | | 0% | 0.0 | 14% | 2.0 | 03, 21, 23 |
| 43 | 29 | 7% | 2.0 | 4.5% | 1.3 | 2.5% | 0.7 | | | 100% | 0.22 | 0% | 0.0 | 15% | 4.3 | 03, 21 |
| 44 | 9 | 7% | 0 | 4.5% | 0.4 | 2.0% | 0.2 | | | | | 0% | 0.0 | 7% | 0.6 | 03, 21 |
| 47 | 19 | 17% | 3.2 | 6.0% | 1.1 | 2.0% | 0.4 | 100% | 1.4 | | | 12% | 2.3 | 20% | 3.8 | 03, 21 |
| 48 | 27 | 7% | 1.9 | 6.0% | 1.6 | 2.0% | 0.5 | 100% | 0.6 | | | 0% | 0.0 | 17% | 4.6 | 01, 21, 22, 23, 31 |
| 49 | 13 | 7% | 0.9 | 6.0% | 0.8 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.0 | 03, 22, 23 |
| 50 | 18 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.7 | 01, 02, 03, 21 |
| 52 | 28 | 7% | 2.0 | 4.5% | 1.3 | 2.5% | 0.7 | | | 100% | 0.37 | 0% | 0.0 | 15% | 4.3 | 03, 24 |
| 53 | 15 | 7% | 0 | 4.5% | 0.7 | 2.0% | 0.3 | | | | | 0% | 0.0 | 7% | 1.0 | 2323414 |
| 55 | 30 | 7% | 2.1 | 6.0% | 1.8 | 2.0% | 0.6 | | | | | 0% | 0.0 | 15% | 4.5 | 2323414 |
| 56 | 151 | 7% | 10.6 | 4.5% | 6.8 | 2.0% | 3.0 | | | | | 0% | 0.0 | 14% | 20.4 | 03, 21, 22 |
| 57 | 32 | 7% | 2.2 | 4.5% | 1.4 | 2.0% | 0.6 | | | | | 0% | 0.0 | 14% | 4.3 | 03, 21, 91 |

| Alternative 4 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| 59 | 22 | 7% | 1.5 | 6.0% | 1.3 | 2.0% | 0.4 | 100% | 0.2 | | | 0% | 0.0 | 16% | 3.5 | 01, 21 |
| 61 | 19 | 7% | 1.3 | 6.0% | 1.1 | 2.0% | 0.4 | | | | | 0% | 0.0 | 15% | 2.9 | 2323414 |
| 62 | 78 | 7% | 5.5 | 4.5% | 3.5 | 2.0% | 1.6 | | | | | 0% | 0.0 | 14% | 10.5 | 03, 21, 23 |
| 63 | 14 | 7% | 0 | 4.5% | 0.6 | 2.0% | 0.3 | 100% | 0.3 | | | 0% | 0.0 | 9% | 1.2 | 01, 23 |
| 64 | 19 | 7% | 0 | 4.5% | 0.9 | 2.0% | 0.4 | 100% | 0.3 | | | 0% | 0.0 | 8% | 1.5 | 03, 23 |
| 65 | 31 | 7% | 2.2 | 4.5% | 1.4 | 2.0% | 0.6 | 100% | 0.3 | | | 0% | 0.0 | 14% | 4.5 | 01, 03, 23 |
| 67 | 8 | 7% | 0.6 | 6.0% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 15% | 1.2 | 01, 23 |
| 68 | 15 | 7% | 1.1 | 6.0% | 0.9 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.3 | 01, 02, 23 |
| 70 | 9 | 17% | 1.5 | 6.0% | 0.5 | 2.0% | 0.2 | 100% | 0.6 | | | 11% | 1.0 | 20% | 1.8 | 01, 24 |
| 71 | 5 | 17% | 0.9 | 6.0% | 0.3 | 2.0% | 0.1 | 100% | 0.6 | | | 16% | 0.8 | 20% | 1.0 | 05, 24 |
| 72 | 21 | 7% | 1.5 | 6.0% | 1.3 | 2.5% | 0.5 | | | 100% | 0.23 | 0% | 0.0 | 17% | 3.5 | 01, 03, 23 |
| 73 | 21 | 17% | 3.6 | 6.0% | 1.3 | 2.5% | 0.5 | | | 100% | 0.17 | 6% | 1.3 | 20% | 4.2 | 23, 91 |
| 74 | 52 | 17% | 8.8 | 6.0% | 3.1 | 2.5% | 1.3 | 100% | 1.9 | 100% | 0.20 | 10% | 5.0 | 20% | 10.4 | 03, 23, 91 |
| 75** | 19 | 7% | 1.33 | 4.5% | 0.9 | 2.5% | 0.5 | | | | | 0% | 0.0 | 14% | 2.7 | 03, 21, 23 |
| 77 | 15 | 17% | 2.6 | 4.5% | 0.7 | 2.5% | 0.4 | | | | | 4% | 0.6 | 20% | 3.0 | 22, 23, 91 |
| 79 | 36 | 7% | 2.5 | 4.5% | 1.6 | 2.5% | 0.9 | | | 100% | 0.42 | 0% | 0.0 | 15% | 5.5 | 03, 21 |
| 80** | 11 | 7% | 0.77 | 4.5% | 0.5 | 2.5% | 0.3 | | | 100% | 0.27 | 0% | 0.0 | 16% | 1.8 | 21, 22 |
| 82 | 5 | 17% | 0.9 | 6.0% | 0.3 | 2.0% | 0.1 | | | | | 5% | 0.3 | 20% | 1.0 | 03, 21 |
| 83 | 35 | 7% | 2.5 | 4.5% | 1.6 | 2.0% | 0.7 | 100% | 0.6 | | | 0% | 0.0 | 15% | 5.3 | 03, 21, 21212 |
| 84 | 23 | 7% | 1.6 | 4.5% | 1.0 | 2.0% | 0.5 | | | | | 0% | 0.0 | 14% | 3.1 | 03, 21 |
| 85 | 12 | 7% | 0.8 | 4.5% | 0.5 | 2.0% | 0.2 | | | | | 0% | 0.0 | 14% | 1.6 | 21, 23 |
| 86 | 138 | 17% | 23.5 | 6.0% | 8.3 | 2.0% | 2.8 | | | | | 5% | 6.9 | 20% | 27.6 | 01, 21, 23, 69 |
| 90 | 8 | 7% | 0.6 | 4.5% | 0.4 | 2.0% | 0.2 | 100% | 0.2 | | | 0% | 0.0 | 16% | 1.3 | 21 |
| 91 | 16 | 7% | 1.1 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.4 | 21 |
| 92 | 120 | 7% | 0 | 6.0% | 7.2 | 2.0% | 2.4 | | | 100% | 0.30 | 0% | 0.0 | 8% | 9.9 | 03, 21 |
| 93 | 13 | 7% | 0.9 | 4.5% | 0.6 | 2.0% | 0.3 | | | | | 0% | 0.0 | 14% | 1.8 | 03, 21 |
| 95 | 16 | 7% | 1.1 | 6.0% | 1.0 | 2.0% | 0.3 | | | | | 0% | 0.0 | 15% | 2.4 | 22, 23 |
| 96 | 75 | 7% | 5.3 | 6.0% | 4.5 | 2.0% | 1.5 | 100% | 0.9 | | | 0% | 0.0 | 16% | 12.1 | 03, 22, 23, 24 |

| Alternative 4 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit # | Acres | Existing | | Harvest | | Fuels | | Temp Rds | | Mech Fire Lines | | Rehab | | Post Rehab | | soil units |
| | | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | DSC % | DSC ac | | | DSC % | DSC ac | DSC % | DSC ac | DSC % |
| Total | | | 171 | | 119 | | 44 | | 10 | | 2.25 | | 24 | | 322 | |

** These units had UNF Level 1 screen checked, and were found to be an order of magnitude too high. The analysis area has approximately 104 mile of roads, covering approximately 250 acres, (250/12,134) = approximately 2% of area. Existing DSC is organized into 3 ranges, 0-9, 10-18, and 19-27. The midpoint of the range is used to summarize DSC. Existing DCS increased by 2% to account for system roads: Harvester Forwarder 3-6% range, used 4.5%; Skid 4-8% range, uses 6%; Mechanical fuel 1-4% range, used 2.5%; Underburn 1-3% range, used 2%.

## Appendix F – Cumulative Effects List of Projects Considered

The following list of projects was considered by each resource specialist. Projects that are applicable to the individual resource are analyzed in Chapter 3.

| PROJECT | | DESCRIPTION | CONDITION |
|---|---|---|---|
| **Timber Harvest** | | | |
| *Year* | *Project Name* | *Size and Type* | |
| 1948 | Unknown #18 | 67 acres: Regeneration Harvest, Partial Removal | |
| 1949 | Unknown #17 | 4471 acres: Regeneration Harvest, Partial Removal | |
| 1950 | Unknown #12 | 2207 acres: Regeneration Harvest, Partial Removal | |
| 1951 | Unknown #13 | 1421 acres: Regeneration Harvest, Partial Removal | |
| 1952 | Unknown #15 | 808 acres: Regeneration Harvest, Partial Removal | |
| 1953 | Unknown #14 | 691 acres: Regeneration Harvest, Partial Removal | |
| 1956 | Unknown #16 | 3379 acres: Regeneration Harvest, Partial Removal | |
| 1957 | Unknown #23 | 147 acres: Regeneration Harvest, Partial Removal | |
| 1968 | Wilson Creek | 276 acres: Selection Cut, Individual Tree | |
| 1973 | Opal Meadow | 178 acres: Selection Cut, Individual Tree | |
| 1980 | Keeney | 5355 acres: Seed Tree Cut, Shelterwood | |
| 1984 | Hog | 1261 acres: 1250 acres, Removal Cut Seed Tree; 7 acres, Removal Cut Overstory; and 4 acres, Clearcut Stand | |
| 1985 | Rough | 128 acres: Regeneration Harvest, Partial Removal | |
| 1986 | Rough | 2127 acres: 1185, Regeneration Harvest, Partial Removal | |

| PROJECT | | DESCRIPTION | CONDITION |
|---|---|---|---|
| 1987 | Rough | 456 acres: Regeneration Harvest, Partial Removal | |
| 1989 | Keeney Seed Tree Removal | 46 acres: Removal Cut, Overstory | |
| 1989 | Skookum | 7 acres: Removal Cut, Overstory | |
| 1990 | Keeney Seed Tree Removal | 715 acres: Removal Cut, Overstory | |
| 1991 | Keeney Seed Tree Removal | 223 acres: 199 acres, Removal Cut Overstory and 24 acres, Thinning | |
| 1992 | Keeney Seed Tree Removal | 327 acres: 299 acres, Removal Cut, Overstory and 28 acres, Seed cut Shelterwood | |
| 1993 | Keeney Seed Tree Removal | 480 acres: 472 acres Removal Cut, Overstory and 8 acres Seed Cut Seed tree | |
| 1994 | Wilson | 23 acres: Selection Cut Individual Tree | |
| 1995 | Wilson | 49 acres: Removal Cut, Overstory | |
| 2004 | Lovlett Area - Private | Industrial harvest of approximately 1,160 acres | Resulted in reduced cover, increased forage, temporary increased road use on both private and FS. |
| 2004-2005 | Rimrock | 2000 acres commercial thinning | These projects are within the Monument winter range and will be included in the cumulative effects analysis for big game. |
| 2005 to present | Bologna | 520 acres salvage, 475 acres commercial thinning | |
| 2005 | Wildhorse | 1200 commercial thinning | |
| Proposed for 2006 | Ant | 778 acres commercial thinning, 122 acres shelterwood salvage | |
| Proposed for 2007 | Falls Meadowbrook, North Fork John Day Ranger District | Vegetation Management project on about 6,800 acres, acres include both commercial and noncommercial thinning | |

| PROJECT | | DESCRIPTION | CONDITION |
|---|---|---|---|
| | | | |
| **Noncommercial Thinning** | | | |
| | | Noncommercial thinning has taken place on approximately 2,420 acres within the analysis area. | Noncommercial thinning of those acres has had the effect of reducing stand density to recommended levels. |
| **Habitat Improvements - Wildlife** | | | |
| | Riparian plantings | | Included in existing condition for aquatic habitat |
| | Fence construction | Electric and permanent fence was constructed to protect riparian habitat for the Middle Columbia steelhead. Grazing rotation and monitoring have successfully maintained forest plan standards and guides. | |
| **Reforestation** | | | |
| 1979 | | 8 acres | Planting and natural regeneration followed most of the shelterwood, seed tree, and clearcut harvest identified above. Approximately 537 acres have been successfully regenerated in the analysis area.<br><br>Regeneration returned units to a fully stocked condition. Many of the stands regenerated in the 1980s and early 1990s are stands now identified as overstocked and in need of a noncommercial thinning. |
| 1980 | | 255 acres | |
| 1985 | | 4 acres | |
| 1987 | | 98 acres | |
| 1994 | | 44 acres | |
| 1995 | | 24 acres | |
| 1996 | | 104 acres | |
| Proposed for 2008 | Ant | 122 acres | Planting in shelterwood harvest units in Monument winter range. |
| **Prescribed Fire** | | | |
| 1984 | Hog | 349 acres | Landscape level prescribed fire has been used to reduce naturally occurring fuels over large areas and to increase grazing quality for both big game and cattle. These fires are generally low intensity fires |
| 1985 | Hog | 273 acres | |
| 1988 | Winter Range | 382 acres | |
| 1990 | Turner Mt. | 434 acres | |

| PROJECT | | DESCRIPTION | CONDITION |
|---|---|---|---|
| 1993 | Three Trough | 2504 acres | burning in a mosaic pattern. The ground area actually burned is less than the acres shown. District records indicate that the following acres have been burned for natural fuels reduction within the project area. |
| 1994 | Three Trough and Coffee Pot | 4031 acres | |
| 1998 | Lower Skookum | 191 acres | |
| 1999 | Lower Skookum | 53 acres | |
| **Fire Suppression** | | | |
| 1970-2004 | < 10 acres in size | | 90 separate fires occurred within the project area. Effects of suppression activities may include: increased road use, movement of soil, felling of snags, reduction in ground fire spread, increase in ground fuels and low level vegetation.<br><br>Fire suppression over the past century has also had a big impact on stand density by extending the historical fire regime of frequent, low intensity fires. With the exclusion of fires over the past century, dense stands have developed over much of the upland forest area. |
| 1960 | Tonto Springs | 138 acres | |
| 1984 | Morphine Springs | 84 acres | |
| 2001 | Little Wall | 45 acres | |
| 2002 | Steamboat | 13 acres | |
| Future Fire suppression | | unknown | Allow reproduction of shade tolerant species to increase. |
| **Grazing** | | | |
| | Late 1800's – mid 1900's Historic Grazing | | Extensive grazing caused a decrease in vegetative coverage and loss of organic layer on areas of shallow soils and a change of hysterical forb-species to less palatable species in areas of deeper soils. |
| | Recent years 1995 to present | Portions of Little Wall and Hardman allotments | Increased use of area roads, fence maintenance activities using both horses and ATVs. Continued use of forage |
| **Transportation** | | | |
| | Road use-all forest activities | 52 miles of open road, including seasonally open roads | Road surface displacement/contamination of aggregate, user developed roads. |

| PROJECT | | DESCRIPTION | CONDITION |
|---|---|---|---|
| Proposed for 2006 | Southern Hazard Tree removal | | Danger trees identified at risk of falling onto road would be felled and possibly removed. All logging is done from open roads. Only a few trees per mile of road are removed. Included in standing dead section of chapter 3. |
| | Road maintenance | Approximately 104 miles of roads are currently shown on the Planning Area. Of those, 41 miles are managed as open or seasonally open roads. 11 Miles are under County jurisdiction and generally maintained yearly. The open Forest roads are maintenance level 2 and not maintained on a regular basis. | May include roadside vegetation brushing or road surface grading. |
| 2004 | Lovlett Road Use Permits | Private haul on FS roads resulted in general maintenance and temporary increased road use.<br>Road 2200019 and 2202017 - 1272 MBF<br>Road 2200082 and 2200083 - 800MBF<br>Road 2122, 2122070, 2122072, and 2202080 - 330 MBF<br>Road 2202 - 808 MBF | No negative residual effect of road use, improved road surface. |
| 1999 | Guardrail and gate construction | Placed 4 guardrails and 1 gate to improve 3.5 miles of closures. | Reduced open road use |
| 1996-1997 | Road Obliteration | 7 roads, totaling 5.3 miles of road obliterated and 7 improved earth barricades on the same roads | No residual effect |
| **Minerals and forest products** | | | |
| | Mushrooms | Mushroom gathering most commonly occurs in the spring and early summer months. Travel occurs on open roads and by foot. Commercial camps have occurred in the recent past. | |
| | Firewood | District firewood cutting allows for cutting and gathering any dead standing or dead down tree, less than 24 | |

| PROJECT | | DESCRIPTION | CONDITION |
|---|---|---|---|
| | | inches in diameter at stump height that is within 300 foot slope distance from any open road. Gathering is not allowed within 300 feet of any live stream, water body, campground, or OHV trial. Ponderosa pine can not be cut for firewood. | |
| | Mining | No active mines in the project area. | |
| | Rock or gravel pits | Keeney Rock Pit @ T6S-R27E-Sec. 20,<br>Opal Springs Borrow Pit @ T6S-R26E-Sec. 12 | |
| | Water Sources (approved) | | |
| | Post and Poles | No post and pole units within the project area | |
| **Recreation** | | | |
| | Hunting | Turkey, grouse, mule deer, rocky mountain elk, cougar, bear: results in day use and dispersed camping throughout the project area. Heaviest use period is from September through November. | Use is seasonal and limited to local sites. |
| | Dispersed camping, other | No designated camp grounds, 18 dispersed camp sites concentrated on ridgetops and high plateaus | |
| | Hiking | No designated hiking trails | |
| | Snowmobiling/skiing | Throughout the District during the winter months. In the C3 Winter Range, there are snowmobile routes totaling: 11 miles of ungroomed trail, 2 miles of groomed trail, and 2 miles of ungroomed designated trail. | |