United States Department of Agriculture

Forest Service

Environmental Assessment

June, 2005

Lower Sheep Timber Sale and Fire Reintroduction Project

Upper and Lower Grande Ronde Sub-basins

Union and Wallowa Counties, Oregon

Responsible Agency

USDA Forest Service
Umatilla National Forest
2517 SW Hailey Ave.
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The EA can be viewed at: www.fs.fed.us/r6/uma/projects/readroom/

DECISION NOTICE,

FINDING OF NO SIGNIFICANT IMPACT, and FINDING OF NON-SIGNIFICANT AMENDMENT

for the

LOWER SHEEP TIMBER SALE and FIRE REINTRODUCTION PROJECT

USDA Forest Service
Umatilla National Forest
Walla Walla Ranger District
Union and Wallowa Counties, Oregon

T4N, R40E, all sections except 31; T4N, R39E, sections 1,12,13,24,25; T4N, R41E, sections 7,18,30,31; T5N, R40E sections 31,32,33,28,29, Willamette Meridian.

Background

Planning and field work for this project began in the summer of 2002. The planning area has three distinct focus areas: the Grande Ronde River and Sheep Creek canyons (Inventoried Roadless Area and Wild and Scenic River); forest lands between the canyon rim and private in-holdings; and upper elevation forests west of the private lands (maps are found on EA page 1-7, Figure 1-3; and page 2-32, Alternative B).

The landscape within the Grande Ronde River and Sheep Creek canyons is characterized by a mosaic of dry forest and grasslands maintained by a frequent fire regime. The steep terrain and existing vegetation in these canyons combine to create the potential for extreme fire behavior. Beyond the rim, toward the private property, the forest changes in character to one maintained by the mixed fire regime with stands comprised of western larch. Most of these stands would also exhibit extreme fire behavior such that a ground crew would need aerial assistance under normal summer conditions to protect the private lands should a wildfire leave a canyon (EA pages 1-3 and 1-4; 3-2 to 3-9; 3-25 to 3-27).

The upper elevations of the planning area are also within the mixed fire regime but a longer return interval between fires has increased the amount of grand fir and Engelmann spruce. Western larch stands with heavy stocking are not regenerating nor are they able to maintain growth. Late old structure is well represented in this area and is above historic ranges. High stocking levels place large trees at risk to mortality from insects and wildfire.

The interdisciplinary team identified the need to increase stand resilience to insects, disease, and wildfire by restoring character reflective of historic fire return intervals and the need to improve forest health and tree vigor in over stocked stands. Additional field review, early in 2003, combined with comments received from the public during scoping revealed an additional need to lower fire severity along interior private land and improve the ability of ground crews to successfully suppress wildfires between the rim of the Grande Ronde canyon and the private lands (EA page 1-4). Following the April 2005, 30-day review and comment period, the District Ranger completed the environmental assessment based in part on many helpful suggestions provided by the public during the comment period. The Forest Supervisor is the responsible official because the project amends the forest plan.

The environmental assessment is available for public review at the Walla Walla Ranger District in Walla Walla, Washington or at the Forest Supervisor's headquarters in Pendleton, Oregon. The environmental assessment is also available on-line at http://www.fs.fed.us/r6/uma/projects/readroom/.

Decision

After careful review of public comments, the environmental assessment, and analysis file, I have decided to implement Alternative B (*Modified Proposed Action*), except that I am omitting units 19, 73, 78, 21, 22, and 86. I have also decided to add another management requirement to address the concern for "relict" size trees: "W*hen removing mistletoe infested trees is required and consistent with eastside screens, no tree over 29 inches will be removed. Any mistletoe trees needing removal will not increase the size of group selections."* A detailed description of Alternative B is found in the EA (pages 2-4 to 2-13) with management requirements on pages 2-20 to 2-26. The following table summarizes activities authorized by this decision.

Activities	Decision	Changes from Alternative B
Harvest:		
Total Harvest Volume (mbf)	9602	-251 mbf
Total Harvest (gross acres)	1755	-57 acres
Total Harvest (net acre)	1633	-49 acres
Logging Systems		
Forwarder, acres (volume mbf)	1708 (9,302)	-20 acres, (110 mbf)
Skyline, acres (volume mbf)	47 (300)	-37 acres, (140 mbf)
Silvicultural Prescriptions		
Commercial Thin – acres	1374	-46 acres
Group Select – acres	158	-11 acres
Single Tree Select - acres	82	No change
Improvement cut – acres	82	No change
Shelterwood – acres	53	No change
Seed Tree – acres	6	No change
Fuel Treatments:		
Acres of total harvest and landscape treatments	4559	-57 acres
Burning understory outside units (acres)	2763	No change
Mechanical fuel treatment (acres)	1274	-9 acres
Acres treated in support of suppression efforts around private lands	4,030	-21 acres
Roads:		
New System Road Construction (miles)	0	No change
Maintenance (miles)	54.8	-1.5 miles
Temporary road construction (miles)	1.9	-0.1
Closed road opened temporarily (miles)	16.3	-1.5
Shaping,blading & surface rock (miles)	7.7	No change
Road brushing (miles)	3.4	No change
Culverts replaced (number)	2	No change
Culverts added (number)	2	No change
Roads decommissioned	0	No change

Reasons for the Decision

I carefully considered concerns raised during scoping and the opportunity to comment (EA Appendix B and L). I considered thirteen alternatives to the proposed action. My reasons for not analyzing eight alternatives in detail are disclosed in the EA, Chapter 2 (EA pages 2-1 to 2-3). The following narrative presents why I omitted units 19, 73, 78, 21, 22, and 86 and why I did not select Alternatives A, C, D, and E. Also presented are narratives that describe how I considered and addressed the purpose and need, significant issues, and other resource concerns in making my decision.

Reasons for Omitting Units 19, 73, 78, 21, 22, and 86

I deleted units 73, 78, 21, and 22 because they are skyline units located in the dry forest biophysical type and there was a possibility that trees over 21 inches would have had to be cut to facilitate skyline logging. I also decided to drop units 21 and 22 because harvest would require the removal of trees within an intermittent riparian area where skyline corridors crossed the RHCA. Units 19 and 86 were dropped because field review indicated they were too steep for forwarders and changing them to skyline yarding would not be economical using the proposed stand prescription.

Reasons for Not Selecting Alternatives A, C, D, and E

I considered, but did not select the no action alternative because it does not address the purpose and need and leaves the forest and adjacent private lands furthest from conditions that reflect the historic fire return interval. It does nothing to reduce severity of wildland fire near private property; nor does it improve protection of private property from fires.

Alternatives C, D, and E each address a conflict relative to the effects of the proposed action and I acknowledge there are attractive aspects to each. On the other hand, Alternatives C, D, and E also omit worthwhile and needed activities.

I did not select Alternative C because all action alternatives maintain existing Late Old Structure stands (EA pages 4-30 to 4-33). Removing understory from Late Old Structure stands protects them from insects, disease, and wildfire while creating only minor effects to LOS dependent species (EA pages 4-38 to 4-40). All cumulative effects to LOS and dependent species are fully consistent with the forest plan. Alternative C also avoids cutting 40 to 100 trees between 21 and 29 inches dbh. However, it is more important to improve stand health and resilience by removing trees that could spread mistletoe to otherwise healthy young trees. Alternative C does not protect private lands as well as Alternative B from a wildfire moving out of the Grande Ronde Canyon at Meadow Creek. It does not improve or maintain low fuel conditions in the upper elevations of the planning area (EA pages 4-7 to 4-10). For these reasons, I feel it is reasonable to select another alternative that more fully addresses the purpose and need.

I did not select Alternative D because all action alternatives adequately conserve lynx habitat (EA, Chapter 4), and Alternative B addresses additional concerns as well. All cumulative effects disclosed for action alternatives are consistent with the amended Forest Plan standards and guidelines for Canada lynx (EA, Chapter 4). Therefore, pursuing another alternative that more fully addressed the purpose and need was reasonable. (EA pages 4-41 to 4-46)

I did not select Alternative E because it did not maintain western larch nor maintain low fuel conditions in the upper elevations of the planning area. I recognize this alternative disturbed fewer acres and impacts were generally less compared to the modified proposed action. However, all cumulative effects disclosed for alternatives B and E are consistent with the Forest Plan and the difference in effects were generally minor, therefore pursuing an alternative that more fully addressed the purpose and need was reasonable.

Lastly, alternatives C, D, and E treat fewer acres of fuel adjacent to private land; Alternative C is 410 acres less than Alternative B, Alternative D is 293 acres less, and Alternative E is 189 acres less. The treatments proposed in Alternative B provide safe conditions for taking suppression actions along the private lands and wildfire could be suppressed at lower costs because more of the area would have fuel conditions that would allow three to four person engine crews to successfully handle them.

Purpose and Need

The following narrative presents how I considered and addressed the purpose and need in making my decision.

I believe my decision affirmatively addresses and best meets the purpose of and need for action. Based on information given to me by the public and information found in the EA and project file I believe there is a clear need to create or extend low fuel conditions supportive of controlling wildfires and to increase resilience of forest stands.

My decision will help maintain large trees on the landscape (Decision Notice, Figure 1). Ladder fuels and overstocked conditions place large trees at risk of damage or being killed by wildfire and insects. Over-crowding stresses trees, attracting insects. I selected Alternative B because thinning would remove competition from small diameter trees and group selections would allow patches of larch to regenerate without changing the stand structure. The few trees between 21 and 29 inches dbh proposed for removal would be outside of late old forest stands and would reduce the potential source of dwarf mistletoe infestation.

I selected Alternative B because it does the most to restore western larch stands, a type that is disappearing on the landscape (EA pages 4-30 to 33; 4-48 to 51). My decision increases the representation of early seral species in stands that are departing from historic conditions. The alternatives differ by the amount of stands being managed to increase western larch regeneration and their dominance in the overstory. Western larch improves a stand's resilience to wildfire, insects, and disease. Western larch is sensitive to over -crowding and when suppressed, larch lose the ability to release as other tree species do. Larch need frequent disturbance to keep stocking levels low and have growing space. Within these stands, grand fir is becoming the dominant species in the understory or co-dominates in the overstory. Western larch is losing its position because openings are not being created for it to regenerate into and the over stocked conditions are not favorable for growth (Decision Notice, Figure 2).

My decision provides the best mix of prescriptions to reduce the intensity of wildland fire coming out of the Grande Ronde canyon and lower the severity of a wildfire along the private lands by modifying the fuel conditions for successful suppression effects (EA pages 4-7 to 4-11). It emphasizes restoration of frequent fire character in sites historically dominated by ponderosa pine using prescribed fire and hand piling and burning with limited use of timber harvest (EA, pages 2-5 to 2-13, 4-1 to 4-11, and EA Appendix C).

Another reason I selected Alternative B is that I believe it will best reduce fire severity near private property and administrative sites and support national and regional emphasis to provide for public and firefighter safety and reduce the cost of fire suppression efforts, after all treatments are accomplished. Alternative B provides the best mix of treatments to prepare the area for successful fire suppression efforts between the rim of the Grande Ronde canyon and private lands. The landscape scale prescribed fire within the canyon will begin the process of reducing fuels and restoring the character of the infrequent fire regime. The proposed harvest focuses treatments in blocks to increase and maintain the amount of Fuel Model 8 between the rim and private lands. It does not attempt to treat all acres at this time; however treated blocks should provide safe areas to anchor future suppression efforts (EA pages 4-7 to 4-10).

Lastly, I believe treatments included in this decision will improve the landscape's resilience to major disturbance events. The decision treats stands in the mixed and frequent fire regimes by thinning overstocked stands, reducing surface fuels, and increasing the height to crown by removing low and intermediate trees in the overstory so that small regeneration and saplings are no longer a ladder fuel threat.

The following table compares the purpose and need with some outcomes of my decision.

Purpose and Need Statement	Outcome of Decision
Maintain and restore vegetation and forest character reflective of historic fire return intervals and other disturbance processes.	Approximately 2,765 acres of landscape prescribed fire and hand piling and burning of small fuels; 80 percent in the frequent fire regime and 19 percent in the mixed.
Reduce severity of wildland fire near private property & FS administrative sites.	Approximately 1,210 acres treated within a half mile of private lands to maintain or develop Fuel Model 8 conditions and 1,289 acres between the rim and private lands. Approximately 5 miles of treatment along private lands.
Maintain western larch in stands currently dominated by that species	Thinning of approximately 347 acres in stands dominated by western larch.
Reduce stocking levels to make stands more resistant to insect attacks & forest diseases while maintaining the mixed species composition.	Approximately 1,680 acres
Maintain stands that have large tree size classes in a mix of early & late seral species in the overstory.	Approximately 590 acres of treatments with a focus on improving the resilience of large trees.
Supply materials & job opportunities to local markets.	1,635 acres of harvest; 9,600 mbf; 1,230 acres of mastication, 105 acres of planting
Amend the Forest Plan to apply management direction related to Canada lynx.	Amends the forest plan to provide objectives, standards and guidelines for the conservation of lynx.

Significant Issues

The following narrative presents how I considered and addressed significant issues raised by the public in making my decision.

Habitat for Canada Lynx: The planning area is within the Timothy Lynx Analysis Unit (LAU). There was a concern that timber harvest and burning activities could change lynx foraging and denning habitat into unsuitable habitat. I looked at the tradeoff between reducing suitable lynx habitat with proposed activities and the benefits from the activities.

Analysis of impacts to lynx habitat indicates that Alternative B may affect but not likely adversely affect Canada lynx. The Blue Mountains are considered dispersal habitat (EA, Chapter 3, EA pages 3-33 and 3-35) and there are no resident populations, so impacts to individual lynx are unlikely. The proposed harvest within lynx habitat would reduce 2 percent of the suitable habitat within the Timothy LAU causing a cumulative total of 26 percent unsuitable. About half of this will likely become suitable habitat in the next 15 years. The expected unsuitable habitat condition is well within the standard of 30 percent unsuitable and a 1 percent cumulative conversion to unsuitable habitat within the ten year period beginning in 2000; this is also consistent with the Forest Plan as amended to incorporate the objectives, standards and guidelines for Canada lynx for the duration of the Lower Sheep Project. I decided that the long term benefits from activities in lynx habitat out-weigh the short term reduction in suitable habitat (EA pages 4-41 to 4-46).

Late/Old Structure Habitat and Large Trees: During the comment period, one writer mistakenly thought that the project would cut very large trees, and objected to cutting 55 inch trees. Since protecting and preserving such trees is a purpose of this project, this comment helped us understand that the project needed clarifying on this issue. Towards this end, I added a management requirement to address the concern for "relict" size trees: "*When mistletoe infested trees need to be removed, no tree over 29 inches will be removed. The mistletoe tree removal will not increase the size of the group selection."* Thus, the decision includes harvesting 40 to 100 larch trees between 21 and 29 inches in diameter within fifty feet of group selections in stands outside of late old structure. These trees will be cut to remove disease sources in group selection harvests designed to regenerate western larch. There will be no removal of trees larger than 21inches from stands of late old structure. Large trees would remain common on the landscape and late old structure stands will still have sufficient large diameter trees and snags to remain late old structure (EA pages 4-30 to 4-33 and 4-38 to 4-41).

I considered both the value to the forest of retaining these trees and the benefits of cutting them. While we are concerned about spreading disease from large infected trees, we also recognize the value of large trees as future snags. At the same time, large infected trees located above young stands can be the source of disease that affects forest health. This project seeks to balance these considerations by removing only those 21 to 29 inch trees that are positioned to have the greatest effects on understory trees, within stands that are not late old structure.

On a field trip last year representatives of Hells Canyon Preservation Council stated their organization was not necessarily against cutting trees over 21 inches. They were concerned primarily about removing trees via commercial timber sale because it introduced the possibility of trees being removed for economic reasons instead of resource reasons. Although I believe it is a benefit to realize commercial value while accomplishing resource objectives, and this is a purpose and need of the project, I can appreciate that the purpose for this project could be trusted at a higher level by this organization if there were no commercial aspect to an activity.

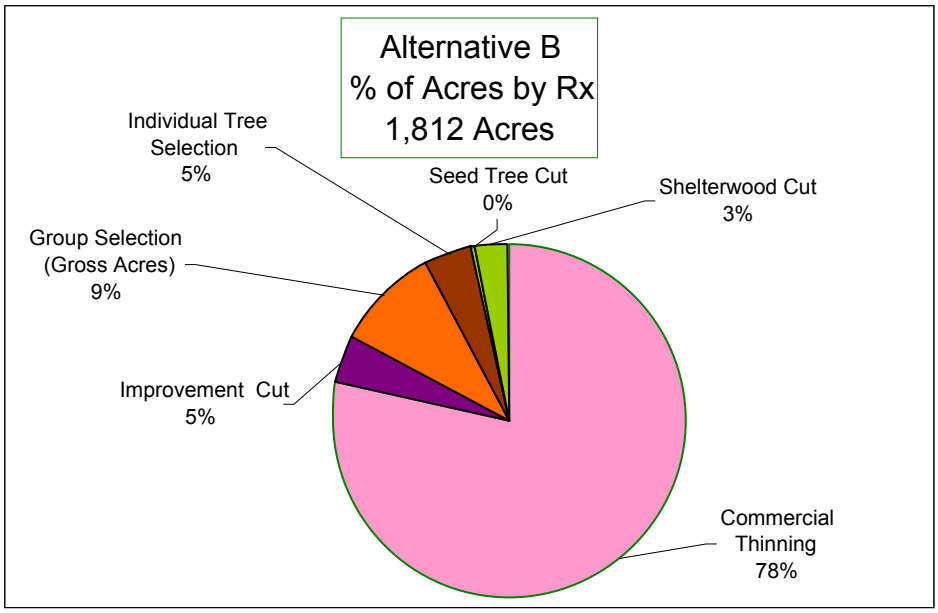
With all of this in mind, the IDT considered options for reducing the risk of disease spread from large trees without removing those trees with a timber sale. We evaluated dropping and leaving diseased trees; we also considered girdling them and leaving them standing. Either of these options would accomplish the forest health objectives as well as commercial removal of the trees and both would require paying a contractor to accomplish the resource objectives, instead of generating money for the Treasury while improving conditions. Because there is no ready source of funds to pay for having the work done, and because there are public benefits from removing the source of infection to the stands, providing wood for the local economy, and generating funds to the Treasury, I concluded that the best way of reducing infection in the stands is through commercial timber harvest.

Other Resource Concerns

The following narrative presents how I considered and addressed other resource concerns raised by the public in making my decision.

Use of Regeneration Harvest: Some believe that regeneration harvest is a treatment that should no longer be used on National Forests. In my decision, regeneration harvest will occur on 60 out of 1,755 acres; or 3 percent of the proposed harvest prescriptions (Decision Notice, Figure 3). Shelterwood and seedtree prescriptions will be implemented in stands with high levels of disease. I believe regeneration harvest is appropriate under these conditions (EA pages 2-27, 2-29 and 2-3).

Figure 3



Big Game Cover: This area was studied in the late 1990s for road decommissioning. Recommendations were made and roads no longer needed for the system were decommissioned. Currently Management Area C4 – Big Game has 61 percent total cover and 17 percent satisfactory cover within the planning area; none of the alternatives would change total cover. Even though there was a need to treat more acres for stocking level control I decided to not reduce satisfactory cover below 15 percent which is well above the forest plan standard for satisfactory cover of 10 percent. Stands supporting wildfire suppression efforts were given the highest priority for inclusion in the project proposal (EA page 1-4; and Alternatives in Chapter 2). Thermal cover will be retained at existing levels even with a reduction of satisfactory cover. The mosaic in age of plantations provides hiding cover as does the understory vegetation. The quality of big game habitat would be unchanged to slightly improved by the burning and opening of crowns and growth of shrubs and herbaceous species in forested stands and grasses within the canyon and harvest units would also be improved.

Soil Impacts: The cumulative effects analysis for soils indicates Forest Plan standards and guidelines would be met (EA pages 4-12 to 4-17). Field review of proposed units for impacts to soils indicated that residual detrimental soil conditions would not limit future activities. Several plantations with off-site pine were proposed for restoration. However, treatments would have caused detrimental soil conditions, and I decided not to enter these plantations (EA page 2-3).

Wild and Scenic River and Roadless Areas: The eastern portion of the planning area is within the Grande Ronde Wild and Scenic River corridor and the inventoried Grande Ronde Roadless Area. Prescribed fire would be used to reduce ladder fuels and stocking levels here. Even though it would take longer to reach desired fuel goals and frequent fire character, prescribe fire is more compatible than timber harvest with the outstanding resource values of the wild and scenic river (EA pages 4-53 to 4-58).

Roads: Some commentors suggest every project reduce road densities. However, road decommissioning for this area was studied and implemented in the late 1990s. This previous road decommissioning reduced the road system to appropriate levels; there is little opportunity for additional decommissioning. Approximately 2 miles of short-term temporary roads would be used to access four harvest units (EA pages 3-40; 4-52 to 4-53). These temporary roads were found to have acceptable effects.

Alternatives Considered

The EA considered five alternatives in detail, including the no action. Alternatives B, C, and E include a forest plan amendment that add management direction for Canada lynx. A detailed description and comparison of all alternatives, including eight alternatives considered but eliminated from detailed study, can be found in Chapter 2 of the EA.

The final modified proposed action and alternatives were refined over three field seasons. All alternatives would accomplish the purpose and need and incorporate design features that protect various resource values and include a forest plan amendment when activities are proposed in lynx habitat. The alternatives to the proposed action are responsive to significant issues raised during scoping. The table following the alternative descriptions summarizes the outcomes and activities of each alternative.

Alternative A – No Action
Alternative A represents the existing situation, uses, and environmental processes. No new management actions would take place. Current management direction and existing activities, fire protection, and road maintenance would continue. Current biological and physical processes creating stand disturbance and changes would be allowed to continue. Current management plans would continue to guide management of the project area (EA page 2-4).

Alternative B – Modified Proposed Action, Forest Health
This alternative restores a forest character more reflective of historic fire and other disturbance processes using prescribed fire and timber harvest. This action would accomplish all of the purposes listed in Chapter 1 to the extent possible within the Forest Plan standards and guidelines. This alternative is smaller than the original proposed action, a result of further study by the IDT (EA pages 2-4 to 2-13).

Alternative C –Forest health without activities in Late Old Structure
Alternative C is the same as Alternative B except there would be no harvest in late old structure or cutting trees greater than or equal to 21 inches trees. It is responsive to concerns that timber harvest and burning could adversely impact species dependent on late old structure (EA pages 2-13 to 2-15).

Alternative D – Forest health without activities in lynx habitat
Alternative D is the same as Alternative B except there would be no harvest in lynx habitat. Although all alternatives comply with Forest Plan management direction for lynx, Alternative D would implement activities **only** outside of lynx habitat. For some commenters the thought of no management in lynx habitat provides protection. This alternative addresses concerns that timber harvest and burning could adversely impact Canada lynx (EA pages 2-15 to 2-18).

Alternative E – Protection of private property
Alternative E is the same as Alternative B except Alternative E focuses on minimizing loss to private property from wildfire. This alternative contains only the harvest units that would reduce wildfire intensity at the private property boundary. It is responsive to concerns that forest health restoration is too broad and that fuel reduction needs to be focused around private lands (EA pages 2-18 to 2-20).

Comparison of Alternatives				
Activities	**Alt B**	**Alt C**	**Alt D**	**Alt E**
Harvest:				
Total Harvest Volume (mbf)	9853	6244	5948	5748
Total Harvest (gross acres)	1812	1208	1090	1108
Total Harvest (net acre)	1682	1175	1074	1064
Commercial Thin – acres	1420	1006	861	834
Group Select – acres	169	47	28	60
Single Tree Select - acres	82	82	82	82
Improvement cut – acres	82	25	60	73
Shelterwood – acres	53	42	53	53
Seed Tree – acres	6	6	6	6
Skyline(S) or Helicopter(H) (# of units)	S 5	H 5	S 2	S 2
Fuel Treatments:				
Total Fuel Treatments (acres)	4616	4012	3894	3912
Burning understory outside units (acres)	2763	2763	2763	2763
Mechanical fuel treatment (acres)	1283	917	833	908
Roads:				
New System Road Construction (miles)	0	0	0	0
Maintenance (miles)	56.3	52.10	34.9	30.2
Temporary road construction (miles)	2	.7	1.1	1.5
Closed road opened temporarily (miles)	17.8	17.2	7	6.4
Shaping,blading & surface rock (miles)	7.7	7.7	7.7	7.7
Road brushing (miles)	3.4	2.6	2.6	2.6
Culverts replaced (number)	2	2	2	2
Forest Plan Amendment for Canada lynx	Yes	Yes	No	Yes

Public Involvement

Public scoping began March 10, 2003 by mailing a proposed action to 126 individuals, groups, agencies, organizations, and tribal governments. The District received three written responses. A discussion of issues raised during scoping is included in Appendix B of the EA. Issues raised during public scoping were used to develop alternatives. On April 17, 2005 the District began the 30-day comment period consistent with regulations issued June 4, 2003, CFR 215.3 and 215.5. The responsible official determined this was the most effective time to publish the legal notice and provide opportunity to comment. Information provided during the comment period included the purpose and need for action, a description of alternatives, management requirements that would be applied during project implementation, a narrative response to concerns raised during scoping, and a statement about the Forest Plan amendment. The District received comments from one individual and three organizations. The comments and resource concerns have helped the District refine the analysis presented in this EA.

Finding of No Significant Impact

My determination of significance is based on careful consideration of the EA and project file as compared to the context and intensity factors listed in 40 CFR 1508.27.

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 Lower Sheep analysis included about 26,343 acres. The selected alternative included vegetation modification activities on 4,616 acres, about 18 percent of the planning 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 along the boundary of private lands by reducing fuel concentrations between the canyon rim and the private lands. 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 4). The analyses also found that the activity may affect but not likely to adversely effect any listed fish species or critical fish habitat and Canada lynx or its habitat. Therefore, in context, this project is local in scope.

Intensity

The environmental effects of the following actions are documented in Chapter 4 of the Environmental Assessment: commercial harvest of trees; tree planting; reduction of fuels by landscape prescribed fire, mastication, underburning, hand pile and jackpot burning, 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, in light of the factors listed below:

1. Impacts that may be both beneficial and adverse (40 CFR 1508.27(b)(1))

The interdisciplinary team analyzed and disclosed the direct, indirect, and cumulative effects of the actions on ecosystems and diversity (EA, pages 4-30 to 4-33), wildlife habitat (pages 4-33 to 4-47), soils (pages 4-12 to 4-17), water (pages 4-17 to 4-24), fire and fuels (pages 4-1 to 4-11), air quality (pages 4-11 to 4-12), range (pages 4-59 to 4-60), transportation (pages 4-52 to 4-53), timber (pages 4-48 to 4-51), visual quality (pages 4-58), and pest management (pages 4-60 to 4-62).

The direct, indirect, and cumulative effects of the selected alternative included the following:

Finding from the Analysis	EA page Number
There would be a short-term increase in fine fuels and small fuels as a result of timber harvest. Slash reduction treatments include mastication and burning that would bring fuel loads to desired conditions as defined for Fuel Model 8. These reductions would reduce starts and help to successfully suppress wildfire or alter fuel concentrations to aid in controlling the size of future wildfires.	Pages 4-4 and 4-6.
The increase in the height to crown would reduce the risk of fire moving into the crowns. Saplings not killed by fire would be retained for wildlife values.	Page 4-6
The proposed landscape prescribed fire treatment along the rim and into the canyon is common to all alternatives and would decrease the risk of crown fire and reduce intensities of fires coming out of the canyon. The proposed harvest units between the rim and the private lands are located in areas that aid in suppression by increasing the area of low fuel accumulations on the landscape.	Page 4-9
The project may slightly increase the amount of acres within the planning area with detrimental soil conditions, however all activity units are consistent with the Forest Plan; impacts to soil productivity will be immeasurable.	Page 4-14
Past results using in-woods processors (including the cut-to-length systems using forwarders) have been quite favorable. The slash mats spread compressive forces while little to no soil displacement occurs, as there are minimal turning forces or dragging of trees to cause mixing of surface soil. Landings often overlap existing roads thereby limiting additional impacts.	Page 4-14
Exposed soil from prescribed fire would be scattered in a mosaic pattern and rarely in continuous areas that could become an erosion hazard. Forest Plan standards and guidelines would be met; there would be no measurable impacts to soil productivity.	Page 4-15
The field review of soils in units that had prior tractor skidding showed they recovered well. Use of harvester/forwarder equipment and designated forwarder routes minimizes additional displacement and compaction and detrimental soil conditions are expected to stay well within Forest Plan standards and guidelines.	Page 4-15
The proposed activities will not increase stream temperatures.	Page 4-18
Commercial harvest would create small, scattered patches of bare ground that would have a low risk for erosion. Surrounding undisturbed vegetation and RHCA protection would prevent transport of any eroded sediment into surface waters.	Page 4-20
There is a low likelihood of erosion from prescribed burning due to short slope lengths of exposed soil. The risk of sedimentation is low due to surrounding unburned debris and vegetation. However, because mineral soil might be exposed adjacent to channels, a small amount of sediment might enter channels during intense storms and spring runoff for the first year after burning. It is very unlikely that sedimentation would occur at levels that would measurably affect water quality or deposition in channels.	Page 4-20
No sediment would move from the culvert replacement sites until fall rains or spring runoff.	Page 4-21
With this magnitude of treatment, it is unlikely that private actions would combine with the proposed project to measurably change water yield or peak flows of the streams in the analysis area as they leave the National Forest System.	Page 4-23
This project would not measurably add chemical contaminants and nutrients to the stream systems or cause degradation of habitat. There are no other sources of contamination that would causes cumulative effects.	Page 4-26
Because none of the component activities of the Lower sheep project would significantly alter the sediment flux, substrate imbeddedness would be unchanged. The discountable amount of sediment potentially delivered to the Grande Ronde River would not be measurable against background turbidity and would be flushed from the system by the high flows of the Grande Ronde River.	Page 4-28
The proposed activities will not alter pool frequency.	Page 4-28
No subwatershed surpasses 15 percent ETA (Equivalent Treatment Area, this is the same as equivalent clearcut area) and would not be expected to cause detectable changes in water yield or to peak or base flows.	Page 4-29
All temporary roads are located along ridgetops so they will not contribute to the drainage network. The less than 0.1 miles per square mile increase in road density would be short-term (1 to 3 months), and would not impact fish habitat. The roads are not located in RHCAs nor connected hydrologically to fisheries habitat.	Page 4-29
The proposed thinning and group sections would not change the percentage of any of the structural stages in the planning area.	Page 4-31
The reduction in stand stocking levels would allow faster growth and would increase resilience. The reduced fuel structure would help protect large trees from wildfires. Vigor of the remaining trees would increase, reducing the risk of mortality from insect epidemics.	Page 4-32 and 4-33
Harvest of diseased trees, thinning, and fuels treatment activities would not reduce the total amount of big game thermal cover in the area. Some satisfactory cover will be converted to marginal, and hiding cover would be reduced. The remaining satisfactory cover would provide security habitat over 15.4 percent of the planning area, which above forest plan standard. The Habitat Effectiveness Index (HEI) value for C4 would drop one point in all	Page 4-34

alternatives, from 63 to 62. This value is above the forest plan standard for MA C4.	
Some satisfactory cover in Management Area E2 will be converted to marginal cover. However there will still be 20% satisfactory cover remaining, well above the forest plan minimum standard.	Page 4-34
The quantity and distribution of satisfactory cover and marginal cover will not change as result of proposed fuel treatments, however, hiding cover would be reduced.	Page 4-34
There would be little change in big game population because of the current state deer and elk management strategies.	Page 4-35
Cumulatively the effects of proposed activities in combination with other existing and potential future effects are not expected to negatively impact Rocky Mountain elk and other big game species. The quality of big game habitat would remain unchanged or slightly improved by the burning and opening of crowns.	Page 4-36
Proposed commercial thinning and group selections would reduce snag and down wood densities in the planning area, reducing habitat for primary cavity excavator species. Although no currently existing down wood would be removed with harvest, there would be fewer snags to provide down wood in the future. Because a large number of snags are available in this area, very little measurable difference can be shown between the alternatives. The overall 1 percent reduction in snags will not impact populations.	Page 4-36, 4-37, 4-47
While no loss of late old structure is expected, wildlife species currently using these stands would be affected by the treatments to varying degrees. Existing habitat for some species such as the northern goshawk, pileated woodpecker, and some neotropical migratory birds would be affected to a small degree simply because of stand disturbance and changes in microhabitats. Connectivity in thinned stands would remain functional and allow the free movement of old-growth-dependent wildlife. Treating these stands would benefit connectivity in the long-term by creating healthier conditions for tree development and growth.	Page 4-39
After project implementation, less than 30 percent of the lynx habitat in the Timothy LAU would be in unsuitable condition (Table 4-22). This is consistent with the Forest Plan as amended. Harvest and fuels treatments would not preclude a return to suitable habitat in the future and the stands should develop into lynx foraging habitat in 15 to 20 years. Given the low open road density in the area, and the location of the proposed road activities, no meaningful changes to lynx habitat would occur from road activities. None of the proposed activities would change connectivity between LAUs because no harvest would occur on the western side of the Timothy LAU.	Page 4-41 and 4-43
Habitat for Neotropical migratory birds and other land birds that are dependent upon open, single-stratum stands and understory shrubs would slightly increase with thinning and fuels treatments. Most stands would retain their current multi-storied structure. Old growth characteristics would be enhanced, and stand composition and structure would more closely resemble what was historically present. Underburning would remove some shrubs, grasses, and seedlings from the understory, which would temporarily reduce cover for birds and decrease foraging habitat. However, in the year following burning, grasses, forbs and shrubs would re-occupy the burned area.	Page 4-46
Fire within the Grande Ronde Wild and Scenic River Corridor and Inventoried Roadless Area is a natural occurrence. Although a prescribed fire is a management action, after treatment the landscape would still have a natural appearance. Prescribed fire would not be as intense as that expected with a wildfire, especially when considering the current fuel conditions in the area. Management actions would not impact the use of the area for rafting. Solitude and outstanding and remarkable values would be retained.	Page 4-53 to 4-58

While the EA discloses short-term and minor deviations from the existing conditions, in my experience with similar projects, none of these effects have been found to be significant. All proposed activities would result in conditions consistent with the Forest Plan.

2. Effects to public health and safety (40 CFR 1508.27(b)2)).

Management Requirements and project design (EA, pages 2-20 to 2-26), including best management practices (Appendix E, pages E1 to E8), will reduce impacts to acceptable levels. Beneficial uses of water are described in the EA, pages 3-15 to 3-17. The analysis determined the projects to be compatible with the findings and recommendations of the Upper Grande Ronde River Subbasin Total Maximum Daily Load and Water Quality Management Plan (EA, pages 3-16 to 3-17 and 4-65 to 4-66). Beneficial uses would not be impacted within or downstream of the planning area. Past experience has shown that air quality declines are limited in scope to the general burn area and are of short duration. Prescribed fires will occur at times when the air is unstable and smoke can mix with the upper atmosphere. Monitoring by EPA for PM10 particles has shown thresholds of health concerns are not reached during periods of wildfires or prescribed fire (EA, pages 4-11 to 4-12). Road maintenance will provide for increased public safety on roads because of the improved surface (EA, pages 4-52 to 4-53). Increased fire fighter and public safety will result from reducing wildfire intensity and severity. The

combined harvest and surface fuel treatments would lower the intensity and rate of spread of wildfires allowing for safer control measures to be taken near private property (EA, pages 4-3 to 4-11).

3. Effects to unique characteristics of the geographic area (40 CFR 1508.27(b)(3)).

Avoidance measures will be implemented to protect Cultural Resources. Twenty-seven sites are considered potentially eligible for inclusion in the National Register of Historic Places and will be protected from activities associated with the project. There would be no effect to any cultural property (EA, page 4-62). Only landscape burns are being proposed in roadless areas. A portion of the Grande Ronde Inventoried Roadless is within the planning area and the proposed prescribed fire will conserve roadless character and values (EA, pages 4-57- 4-58). The project will not impact wetlands or floodplains (EA, page 4-65). A portion of the Grande Ronde Wild and Scenic River is within the planning area. The project is consistent with the *Wallowa and Grande Ronde Rivers Final Management Plan and the Oregon State Scenic Waterways Program.* (EA pages 4-53 to 4-57) and will conserve outstanding and remarkable values.

4. Effects on the quality of the human environment that are likely to be highly controversial (40 CFR 1508.27(b)(4)).

There are differing opinions within the local area on the importance or role fire disturbance and timber harvest should play in the ecosystem. The level of controversy or interest in what course of action to take regarding the use of timber harvest and prescribed fire to achieve desired conditions in the Forest Plan and the purpose and need for this project are not the focus of this criterion, rather the degree of controversy over the effects disclosed in the analysis.

Cutting of 21 inch dbh trees. Controversy over cutting large trees is recognized. This project would cut an estimated 40 to100 trees with diameters over 21". After harvest, large trees would remain common on the landscape. The amount of late old structure would be the same after completion of the project. "Relict" size trees would be protected by a requirement to keep all trees larger than 29 inches.

No significant disagreements have been identified with the disclosure of effects in the EA or public comments. While some commenters disagreed with the conclusion that a combination of prescribed fire and timber harvest would help move the existing vegetative conditions closer to desired conditions listed in the Forest Plan and the purpose and need, the reasons for this difference are based on opinions, not with the disclosure of effects. Although there is controversy and disagreement among the public over the potential for significant effects from a project of this size, the professional experts and scientific research consulted agree that the activities can be implemented without significant adverse effects on the environment. All actions meet Forest Plan standards and guidelines (EA, Chapter IV and pages 4-66 to 4-68). Concerns raised during scoping were considered and responded to in Appendix B and L of the EA.

5. Effects on the human environment that are highly uncertain, or involve unknown risks (40 CFR 1508.28(b)(5)).

My decision will not impose any highly uncertain, unique, or unknown environmental risks. Thinning, harvest, mechanical fuel treatment, prescribed fire and tree planting have been implemented successfully on the Umatilla National Forest in the past, meeting regulations concerning these activities and protecting National Forest resources. Past monitoring and experience with these types of activities has shown that the effects disclosed in the EA are not uncertain, and do not involve unique or unknown risk. Recent monitoring has found that Best Management Practices for protecting soil and water resources are effective in keeping detrimental impacts to within Forest Plan standards and in compliance with the Clean Water Act.

6. Establishment of a precedent for future actions with significant effects or implication of a decision in principle about a future consideration (40 CFR 1508.27(b)(6)).

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. The Forest Plan allows harvest, thinning, planting, and prescribed burning in this area. 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. Harvest of

trees over 21" is consistent with the forest plan as amended by eastside screens. The lynx amendment and associated guidelines only apply to this project.

7. Relationship to other actions with individually insignificant but cumulative significant impacts (40 CFR 1508.27(b)(7)).

EA, pages 3-1 to 3-2 lists existing permits, contracts, and uses both within and adjacent to the planning area, along with reasonably foreseeable future projects. These actions were considered when the cumulative effects for various resources were discussed in Chapter IV. Past actions were also included when analyzing the impacts to water quality, through the use of equivalent treatment acres (ETA); big game with HEI and cover to forage ratios and by estimating the residual detrimental soil condition from past ground based skidding. Private lands below the Forest boundary were also considered in determining cumulative effects. The analysis did not indicate significant cumulative effects. Forest standards and guidelines would be met and the activity on the Forest would not cause measurable impacts below the Forest boundary.

8. Effects to resources listed or eligible for listing in the National Register of Historic Places, and significant scientific, cultural, or historic resources (40 CFR 1508,27(b)(8)).

The planning area has been surveyed and cultural sites were inventoried. Twenty-seven sites have been determined as eligible for listing in the National Register of Historic Places. These sites and any sites found later will be protected by avoidance. If any artifacts or sites should be discovered during project implementation, the North Zone Archeologist will be notified and the area will be protected from disturbance until a determination can be made. No activities will occur on known sites (EA, page 4-62). The Forest Plan has not designated any Research National Areas in the planning area. There will be no impact to cultural, historical, or scientific sites. Oregon State Highway 204 forms the eastern boundary of the planning area.

9. The Lower Sheep Timber Sale and Fire Reintroduction Project would not adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)).

The selected alternative would conserve endangered, threatened, and sensitive species and their habitats as required under the Endangered Species Act and Regional guidelines for sensitive species. There are no unique or isolated populations of wildlife or plants. *Carex backii (Back's sedge)* occurs on a small tributary just above the confluence with the Grande Ronde within Fuel Reduction Area 8. It is likely adapted to late season ground fires, although a hot fire could kill them. A low intensity fall burn would not contribute towards a federal listing or cause loss of viability to the species. Fall burning is recommended. Proposed Activities may temporarily impact potential habitat (2 to 5 years) by reducing shade from shrub species, and might impact individual plants, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the species (EA, pages 4-63 to 4-65; and Biological Evaluations for aquatic, terrestrial, and plant species in the Analysis File).

The action alternatives will not adversely affect essential chinook salmon habitat. The project has been determined to "may effect not likely to adversely effect" Columbia River bull trout, Snake River steelhead, Snake River spring/summer chinook salmon, Snake River fall chinook salmon and Canada lynx. The project has been consulted and the USDI Fish and Wildlife Service and the National Marine Fisheries Service concur with the findings. The project includes a Forest Plan Amendment for the conservation of lynx.

10. The Lower Sheep Timber Sale and Fire Reintroduction Project does not threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10))

The project complies with the USFWS Director's order #131 related to applicability of the Migratory Bird Treaty Act to federal agencies and requirements for permits for "take" and E.O. 13186. Conservation measures have been developed (EA, pages 4-67 to 68). There are no wetlands (EA, page 4-65). The project is in compliance with the Clean Water Act (EA, page 4-65 to 4-66). Water quality is protected by project design (EA, pages 2-20 to 2-26), using low soil disturbance logging systems (EA, pages 4-12 to 4-17), and BMPs (EA, Appendix E). 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 4-62 to 4-71). The action is consistent with the Umatilla National Forest Land and Resource Management Plan (EA, pages 4-67 to 4-68). The Forest Plan amendment does not violate any Federal, State, or Local laws.

Finding

On the basis of the information and analysis contained in the EA as disclosed above, it is my determination that implementation of my selected alternative does not constitute a major Federal Action significantly affecting the quality of the human environment. Therefore an Environmental Impact Statement is not needed.

Findings Required by Other Laws and Regulations

NFMA and Forest Plan Consistency

This decision to harvest and use landscape prescribed fire is consistent with the intent of the Forest Plan's long term goals and objectives summarized in EA Appendix A. The project was designed in conformance with land and resource management plan standards and incorporates appropriate land and resource management plan guidelines for soils, wildlife habitat, riparian and fisheries habitat, timber, ecosystems and diversity, water, soils, fire and fuels, air quality, pest management, threatened, endangered, and sensitive species, visual resources, and management area guidelines (Land and Resource Management Plan, pages 4-47 to 4-195).

No thinning, yarding, prescribed fire ignition or temporary roads would occur within Riparian Habitat Conservation Areas and these activities would be mitigated so they will not cause detrimental changes in riparian areas (EA pages 2-20 to 2-26). Soil and water would be conserved through project design and mitigation (EA pages 2-20 to 2-26 and Appendix E), consistent with Forest Plan Amendment #10 PACFISH (EA pages 4-25 to 4-30 and 4-67). The selected alternative would also be consistent with the Regional Forester's Forest Plan Amendment, also know as the "Eastside Screens" (EA pages 4-67 and Appendix G).

In accordance with 36 CFR 219.27, I conclude from the results of site-specific analysis documented in the EA and analysis file that timber harvest would only occur on those lands identified in the Forest Plan as suitable for timber production (EA pages 4-66 to 67). The selected alternative is consistent with the Umatilla National Forest Land and Resource Management Plan Final Environmental Impact Statement, Record of Decision, the accompanying Land and Resource Management Plan (USDA Forest Service 1990), dated June 11, 1990.

Finding of Non-Significant Amendment

The Forest Service Land and Resource 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 (fifteen year planning period), the less significant the change is likely to be. The Record of Decision for the Umatilla Forest Plan was signed June 11, 1990, so we are in year sixteen. As noted in the EA (Chapter 1, 2, and 4) the action is limited in time in that it would only apply for the duration of the Lower Sheep Timber Sale and Fire Reintroduction project in lynx habitat.

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 management direction in the amendment applies only to lynx habitat and only for the duration of the Lower Sheep project. The Lower Sheep project is within the Timothy lynx analysis unit (LAU). There are about 35,083 acres of lynx habitat with in the Timothy LAU. Of that about 608 acres of lynx habitat are affected by the Lower sheep project; which is about 2 percent of

the total lynx habitat within the LAU. This amount is less than 0.004 percent of the forest planning area (1.4 million acres). Thus, the size of the area affected by the project and amendment is small when compared to the overall planning area.

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 15-year planning period to move toward goals and achieve objectives and outputs are relevant considerations.

The objectives, standards, and guidelines of the amendment are specific to Canada lynx for the duration of the Lower Sheep project. The amendment does not change the goals and objectives for other resources in the forest plan. The amendment does place limitations on timber management, wildland fire management, and road management within the affected portions of the Lower Sheep project. The effects of these limitations are disclosed by alternative in Chapter 4. The amendment is not expected to preclude or require other actions across the forest in lynx habitat and incorporation of this management direction will not change the amount of timber made available for public use outside this project area; will not require changes in grazing permits; plans of operation for mining; or the access and travel management plan (Chapter 4). Therefore, anticipated changes brought about by this amendment in the levels of resource activities and outputs (Forest Plan, page 4-16) projected for this planning period are not expected to be measurable.

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 15-year planning period and changes in desired future conditions or the anticipated goods and services to be produced are relevant considerations. The amendment is specific to, and for the duration of, the Lower Sheep project and will not apply to future decisions throughout the planning area (EA, Chapter 1, 2, and 4). The desired future condition and land allocations are not changed by this decision (EA, Chapter 1, 2, and 4). As discussed above in “goals, objectives, and outputs”, the long-term levels of goods and services projected in current plan for the 15 year planning period are not measurably changed by the Forest Plan amendment.

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 results in a non-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 appeal in accordance with Forest Service regulations at 36 CFR 215.11, June 4, 2003 rule. Any written appeal must be postmarked or received by the Appeal Deciding Officer, Linda Goodman, Regional Forester, ATTN 1570 Appeals, P.O. Box 3623 Portland, OR 97208-3623 within 45 days of the legal notice announcing this decision in the East Oregonian Newspaper. The Appeal must meet the content requirements of 36 CFR 215.14.

The street location for hand delivery: 333 SW 1st Ave, Portland, OR (office hours: 8-4:30 M-F). Send faxes to 503-808-2255. Appeals may be emailed to: appeals-pacificnorthwest-regional-office@fs.fed.us

For further information regarding these appeal procedures, contact the Forest Environmental Coordinator Dave Herr at 541-278-3869

Contact

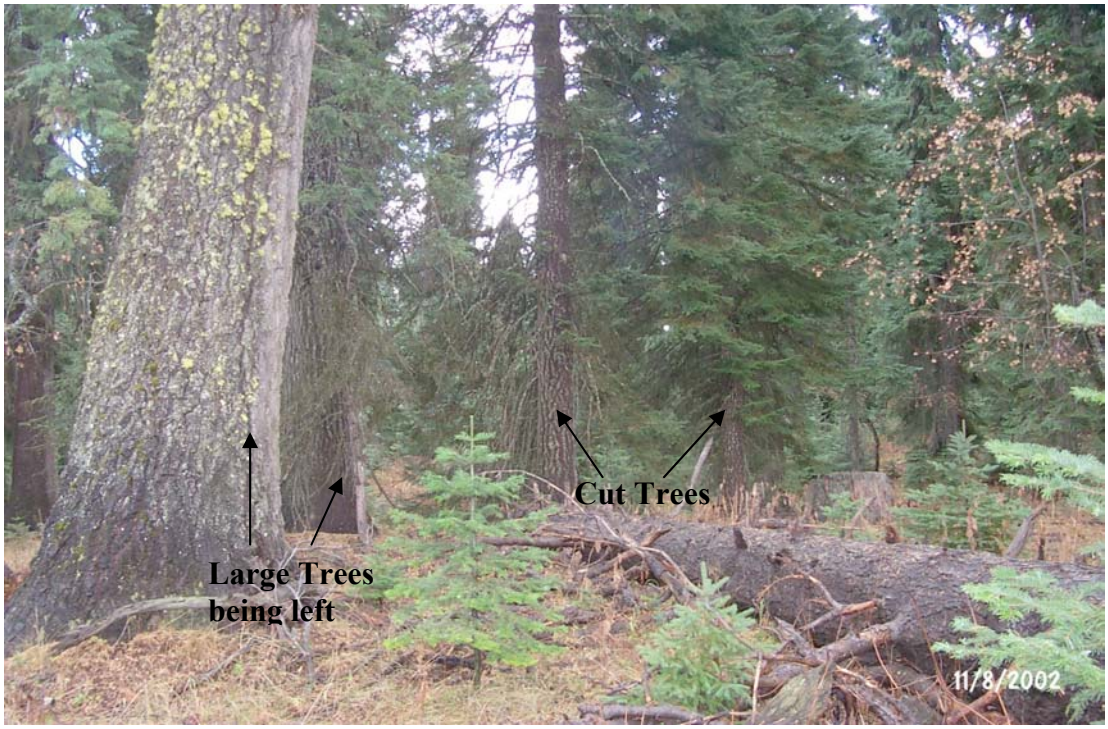
For additional information concerning this decision contact Glen Westlund, District Planner, Walla Walla Ranger District, 1415 West Rose Street, Walla Walla WA, 99362. Phone Number is (509) 522-6009 and E-mail is gwestlund@fs.fed.us. Or contact Dave Herr, Umatilla National Forest, 2517 SW Hailey Avenue, Pendleton, OR 97801, phone number is (541) 278-3869 and E-mail dherr@fs.fed.us.

Richard E. Markley

RICHARD E. MARKLEY
Acting Forest Supervisor

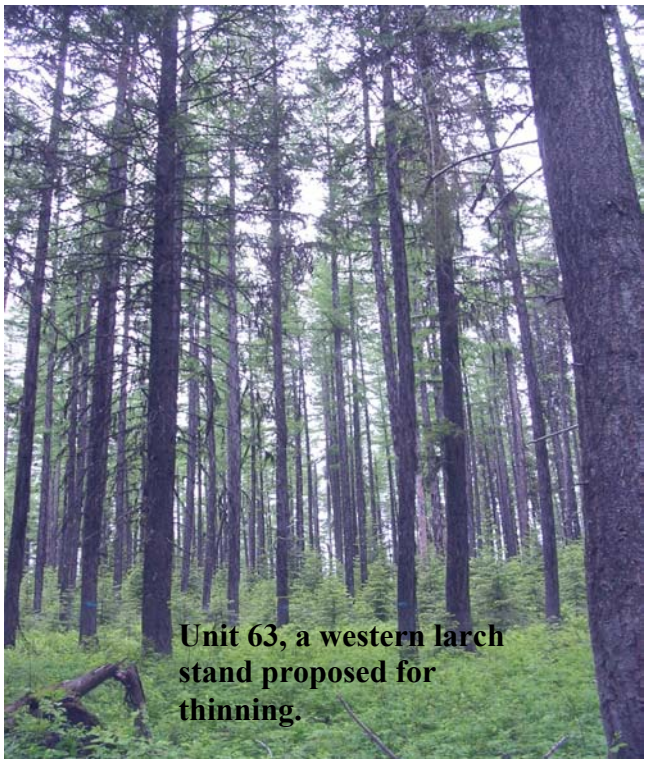
July 8, 2005
Date

Figure 1



Typical (representative) thinning unit where smaller understory trees would be harvested to reduce competition by smaller trees and reduce ladder fuels.

Figure 2



Typical thinning unit where understory trees would be harvested to reduce competition and remove ladder fuels.

Chapter 1 – Purpose and Need

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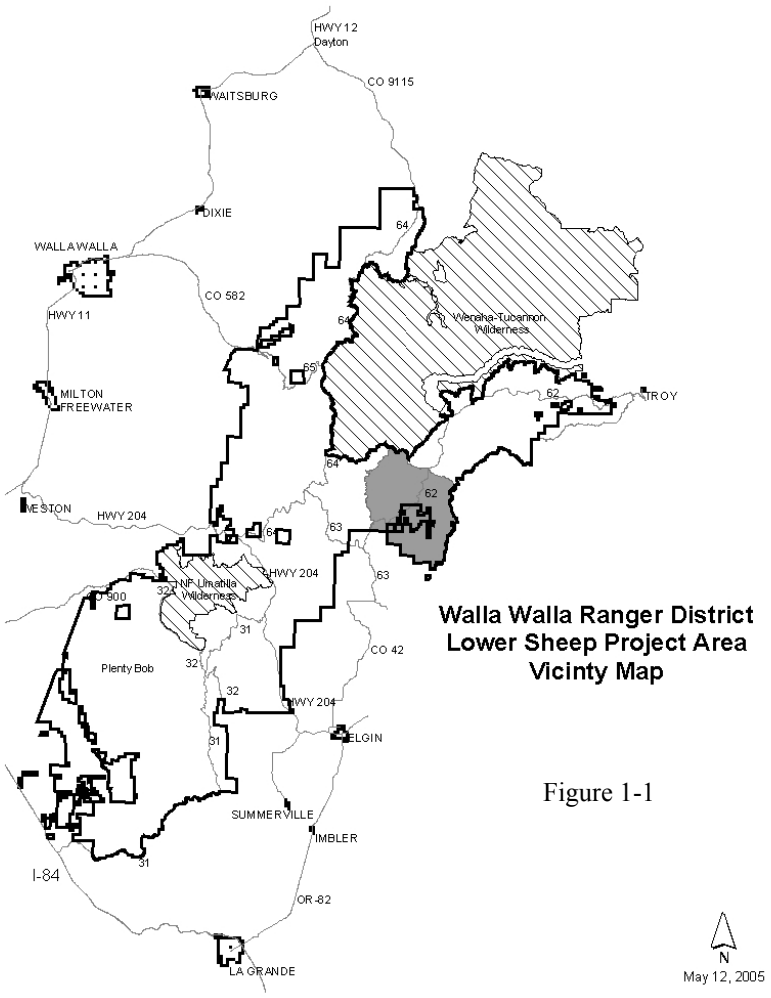
Chapter 1 - Purpose and Need

Introduction:

The Walla Walla Ranger District is proposing the Lower Sheep Timber Sale and Fire Reintroduction Project in order to reduce tree density and restore vegetation and forest character reflective of historic fire return intervals and other disturbance processes. Since the activity is proposed within frequent, mixed, and infrequent fire regimes, stand treatment objectives vary from fuel reduction and maintenance to protection, and forest health relating to stocking level control to maintaining early seral tree species.

Project Location Information:



Walla Walla Ranger District
Lower Sheep Project Area
Vicinty Map

Figure 1-1

Planning Area: The Lower Sheep Planning Area encompasses approximately 26,343 acres; including 2,443 acres of interior private land. The area includes the Grande Ronde Wild and Scenic Area and the Grande Ronde Inventoried Roadless Area.

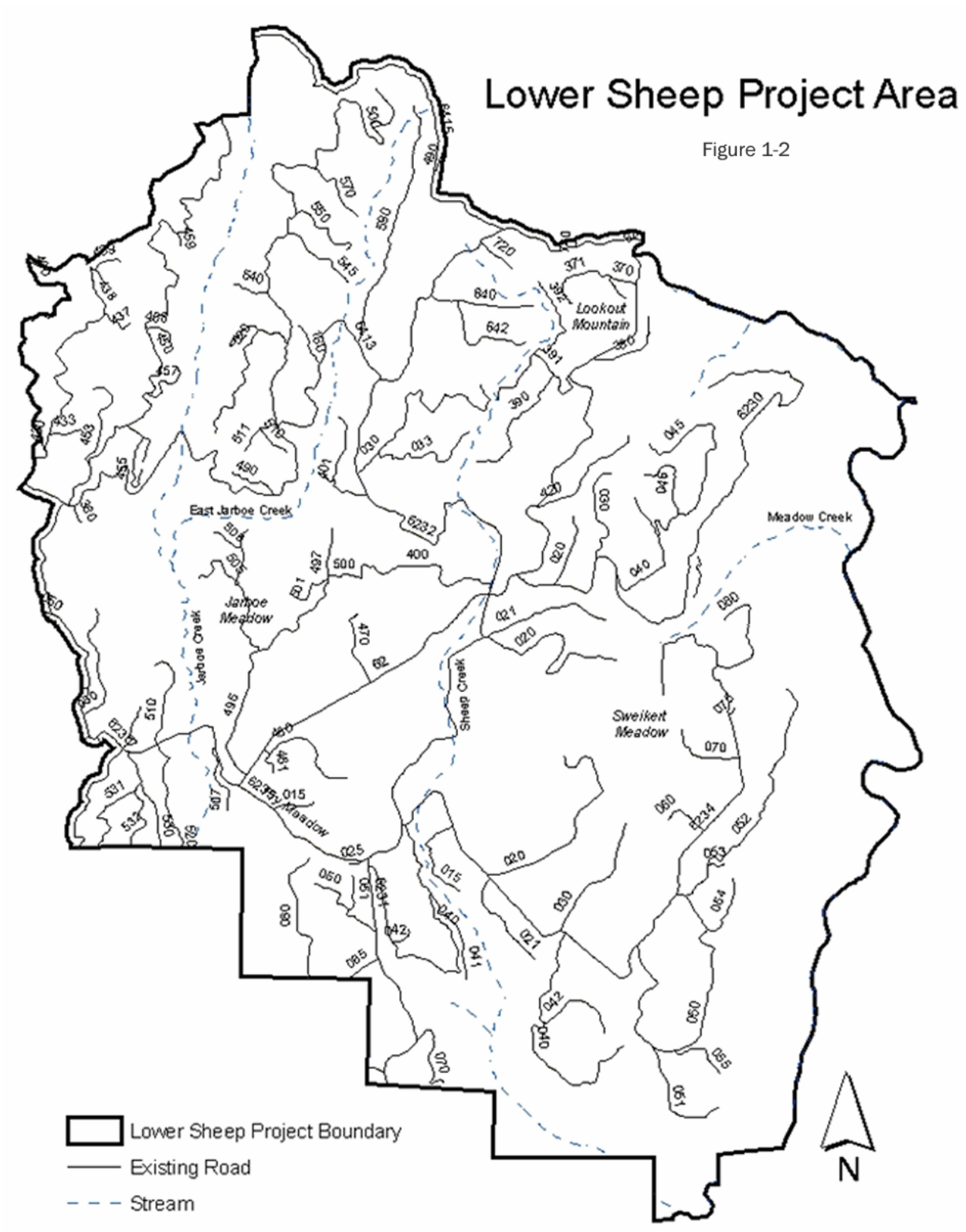
Counties: Wallowa & Union, in Oregon.

Quads: Wenaha Forks, Jubilee Lake, Fry Meadow, Deep Creek, and Partridge Creek (numbers 19, 24, 25, 26, and 30). Most of the planning area is within the Fry Meadow quad (number 25).

Subwatersheds: Grande Ronde R. /Bear Creek, Jarboe, Little Lookingglass, Sheep Creek, Grande Ronde R. /Clear Creek. Jarboe Creek and Sheep Creek are located in the center of the planning area. The planning area is in the Upper and Lower Grande Ronde Sub-Basins.

Location Legals: T4N, R40E, all sections except 31; T4N, R39E, sections 1,12,13,24,25; T4N, R41E, sections 7,18,30,31; T5N, R40E sections 31,32,33,28,29.

In the planning area, the elevation ranges from 5,000 feet in the northwest part to 2,200 feet along the west bank of the Grande Ronde River. The higher elevations of the planning area are cold forest types where subalpine fir and Engelmann spruce are the major dominants. Moist forest types (where grand fir is the major dominant) are found in most of the planning area northwest of the breaks of the Grande Ronde River. Along the slopes above the Grande Ronde the forest types are hotter and dryer, characterized by grass/tree mosaic with forested stands dominated by Douglas-fir and ponderosa pine, mainly associated with drainages intermixed with open grasslands.


Lower Sheep Project Area
Figure 1-2
Lookout Mountain
East Jarboe Creek
Jarboe Meadow
Jarboe Creek
Meadow Creek
Sheep Creek
Sweikert Meadow
Lower Sheep Project Boundary
Existing Road
Stream
N

Background

Historically, wildfires have burned out of the Grande Ronde Canyon and worked their way into the cooler and wetter vegetation types along the breaks. This has resulted in three Fire Regimes in the Planning Area: the Frequent Fire Regime, the Mixed Fire Regime, and the Infrequent Fire Regime. The forests and grasslands on the slopes between the Grande Ronde River and the cooler uplands are a Frequent Fire Regime. The Frequent Fire Regime typically has low severity wildfires with a 15 to 35 year return interval. The area adjacent to the breaks of the Grande Ronde Canyon is mostly a Mixed Fire Regime with a fire return interval between 35 to 100+ years and variable fire severity. In this regime are stands of western larch that have been maintained by the low intensity fires moving out of the Frequent Fire Regime in the canyon and along the rim. It is in these two areas, the Frequent and the Mixed Regime, that there is the greatest opportunity to restore stands to, or maintain stands at, historical fire conditions. The upper elevations are an Infrequent Fire Regime with a 200-years+ fire return interval. Here stand replacement fires are typical. Much of the Frequent Fire Regime (55%) is outside of historic conditions, having missed at least one fire return interval. The Mixed Fire Regime is still within historic conditions but has complex fuel loads and needs to be maintained in a lower fuel condition in order to reduce the fire severity of future wildfires burning out of the Grande Ronde River valley, keep suppression efforts successful around private lands, and maintain seral tree species such as western larch.

There are 2,443 acres of private land just south of center in the analysis area that have a need for fire protection. It is important to manage fuel loads on adjacent National Forest System Lands to reduce fire severity along the boundary of these private lands. The private lands are one to two miles from the breaks of the Grande Ronde. Fuel treatments that would reduce or maintain low fire severity along the breaks would also help reduce fire intensity and severity along the private land boundaries aiding any fire suppression efforts. The fuel reduction and maintenance treatments along the breaks would also aid fire suppression efforts should a wildfire threaten the Forest Service administrative sites of Fry Meadow Recreational Cabin or Fry Creek Seed Orchard.

Stocking levels and fuel levels have increased throughout the Planning Area causing stands to loose resilience to insects, disease and fire disturbances. Stand conditions of concern include: 1. changes in structure that put early seral tree species at risk for catastrophic damage from wildfire; 2. increased inter-tree competition making stands susceptible to environmental stress such as insect and disease; and 3. stands with large trees that have a ladder fuel component that places them at risk for mortality from a crown fire.

Past forest management has greatly reduced the influence of fire in the Lower Sheep Analysis Area. In undisturbed older stands fire-intolerant species, like grand fir and Engelmann spruce, have increased at the expense of fire-tolerant species such as western larch. Understory tree species have also increased within the canyon of the Grande Ronde placing this ponderosa pine dominated forest at risk to catastrophic damage from wildfire. Fire-intolerant species are also causing slowed diameter growth in larch and beginning to challenge larch as the dominant stand component. There is an opportunity to reverse this process and thin stands to maintain growth and vigor of fire tolerant species.

Analysis of stand data for the planning area indicated stands that were undergoing intense inter-tree competition, making them susceptible to environmental stresses (such as insects and disease). There is an opportunity to reduce this competition through stocking control.

Monitoring of past thinning harvests for fire protection indicated we might not be doing enough to protect large trees from damage to crown fires. Where stands have a component of medium and large tree size classes there is an opportunity to reduce understory ladder fuels to reduce the risk of a ground fire moving into the crowns of the larger trees.

Since 1994 timber harvest levels on the Umatilla National Forest has declined by over 60 percent. This has had a negative impact on the economies of Wallowa and Union Counties. The Umatilla National Forest Land and Resource Management Plan (Forest Plan) gives direction, "*Provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources,*

uses, and values which meet local, regional, and national social and economic needs." (Forest Plan p. 4-1) There is an opportunity to provide timber resources to the local economy while accomplishing forest health and fuel reduction goals.

Timber harvest, associated slash treatments, and road maintenance would impact lynx habitat. The *Canada Lynx Conservation Assessment and Strategy* (LCAS) 2000, as amended includes a set of conservation recommendations that are based on the best currently available scientific information about lynx; risks to the species and/or individuals posed by management activities; habitat conditions; and measures that are likely needed to conserve the species. The strategy states in Chapter 7-1 "*These measures are provided to assist federal agencies in seeking opportunities to benefit lynx and help to avoid negative impacts through the thoughtful planning of activities. Plans that incorporate them are generally not expected to have adverse effects on lynx, and implementation of these measures across the range of the lynx is expected to lead to conservation of the species.*" There is a need to provide management direction for the conservation of Canada lynx during this project and fulfill our obligations under the Endangered Species Act.

Brief History of project development: In the summer of 2002 the Walla Walla Ranger District began the analysis of the Sheep Creek Watershed. The landscape was modeled for fuel reduction and stocking level reduction opportunities and, in March 2003, the District began public scoping by mailing a letter that described multiple management activities collectively called *The Lower Sheep Timber Sale and Fire Reintroduction Project*. Based on comments received during scoping and site-specific field review and analysis, the District Ranger decided to drop two purpose and need statements and their associated actions. They were dropped because soils were still recovering from the original harvest and post harvest treatments that created the plantations of off site pine. Further ground disturbance to remove the pine and establish local tree species would exceed current Forest Plan standards and guidelines for detrimental soil conditions. Alternative treatments using helicopters or cable yarding would be too costly to implement. The second purpose and need statement proposed an experiment to develop foraging habitat in a stand identified as unsuitable lynx habitat. Further field evaluation indicated the stand was already foraging habitat so the objective was dropped.

The Purpose and Need

Based on the analysis of the existing condition as summarized above, the purpose and need for action are:

1. Maintain and restore vegetation and forest character reflective of historic fire return intervals and other disturbance processes.
2. Reduce severity of wildland fire near private property and Forest Service administrative sites to allow for more effective protection of those properties.
3. Maintain western larch in stands currently dominated by that species.
4. Reduce stocking levels to make stands more resistant to insect attacks and forest diseases, while maintaining the mixed species composition.
5. Maintain stands that have large tree size classes in a mix of early and late seral species in the overstory.
6. Supply materials and job opportunities to local markets.
7. Amend the Forest Plan specific to this project to apply management direction (objectives, standards and guidelines) related to Canada lynx to guide the conservation of Canada lynx and fulfill our obligations under the Endangered Species Act.

The Proposed Action

The proposed action used for scoping described a project to reduce fuels in seven areas that cover approximately 4,301 acres using prescribed fire (3,000 acres), hand cutting, piling and burning of fuels (53 acres), and timber harvest (220 acres). Timber harvest would also be used on another 2,678 acres to

increase stand vigor and resilience; removing approximately 16 million (mm) board feet. Eight of 73 proposed timber harvest units were located within the seven prescribed burn areas. The proposed timber harvest silvicultural systems include group selection cuts and improvement cuts (see chapter 2 for definitions). Prescribed fire or mechanical mastication would be used to reduce or manage fuels generated by the timber harvest. Connected to this action would be 60 miles of road maintenance including 7.7 miles of surface rock replacement and 2 miles of temporary roads. This proposed action was modified after receiving comments and the District doing additional field review. Chapter 2 has additional information about the proposed action and how it was modified for resource concerns to develop Alternative B, the Modified Proposed Action.

The Forest Service proposes to begin implementing this project in Fiscal Year 2005 or 2006.

The Forest Service proposes to amend the Forest Plan to incorporate management direction (objectives, standards, and guidelines) for Canada lynx (see Chapter II for details). The management direction is consistent with conservation recommendations located in Chapter 7 of the Lynx Conservation Assessment Strategy as amended, 2000. The amendment applies only for the duration of the project and to those actions proposed in lynx habitat.

Other Documents and Decisions applicable to this Analysis

This Environmental Assessment incorporates by reference the Project Record (40 CFR §1502.21). The project record contains specialist reports and other technical documentation used to support the analysis and conclusions in this Environmental Assessment. The specialist reports for Forest Vegetation, Fire and Fuels, Terrestrial Wildlife, Soils, Hydrology, Fisheries, Noxious Weeds, Transportation and Access Management, Botany, and Cultural Resources have been summarized in this document. The detailed report can be found in the project record. The Lower Sheep Timber Sale and Fire Reintroduction Project Environmental Assessment (EA) also incorporates by reference the ***Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds*** (Noxious Weed EA) and it's ***Decision Notice*** (May 24, 1995); Ruggiero et. Al., 2000, ***Ecology and Conservation of Lynx in the United States*** (Lynx Science Report); and Ruediger et. Al., 2000, ***Canada Lynx Conservation Assessment and Strategy*** (LCAS) as amended. Direction for use of the Lynx Science Report and LCAS to promote lynx conservation and its habitat on federal lands administered by the USDA Forest Service and USDI Fish and Wildlife Service is found in the February 2000 Canada Lynx Conservation Agreement extended to December 31, 2005.

This Environmental Assessment process and documentation has been done in accordance to the direction contained in the ***National Forest Management Act (NFMA)***, the ***National Environmental Policy Act (NEPA)***, the ***Council on Environmental Quality (CEQ) Regulations***, the ***Clean Water Act***, and the ***Endangered Species Act***. This Environmental Assessment is tiered to the ***Umatilla National Forest Land and Resource Management Plan FEIS*** and ***Record of Decision*** approved June 11, 1990 and the accompanying ***Land and Resource Management Plan (Forest Plan)***. This includes clarifying direction of Plan Amendment #7 ***Wallowa & Grande Ronde Rivers Final Management Plan/Environmental Assessment,*** dated December 13 1993; Plan Amendment #10 ***Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH),*** dated February 24, 1995; and the ***Regional Forester's Forest Plan Amendment #2 (Umatilla Land and Resource Management Plan Amendment #11)***, dated June 12, 1995. It is also tiered to the ***Managing Competing and Unwanted Vegetation FEIS (Veg FEIS),*** its ***Mediated Agreement, and Record of Decision*** (December 8, 1988).

Relevant portions of the above documents are summarized in Chapters 2, 3, and 4 of this EA when needed to provide management direction or for the evaluation of impacts. Forest Plan direction for management areas is also summarized in Appendix A.

Forest Plan Direction

The Forest Plan (USDA Forest Service 1990), as amended, recognizes the following forest management goals (pp. 4-1 – 4-3):

- To provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources, uses, and values which meet local, regional, and national social and economic needs
- To provide for production and sustained yield of wood fiber and insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency
- To protect forest and range resources and values from unacceptable losses due to destructive forest pests through the practice of integrated pest management
- To provide and execute a fire protection and fire use program that is cost-efficient and responsive to land and resource management goals and objectives

The proposed action and action alternatives were designed to contribute to these goals as supported by the purpose and need.

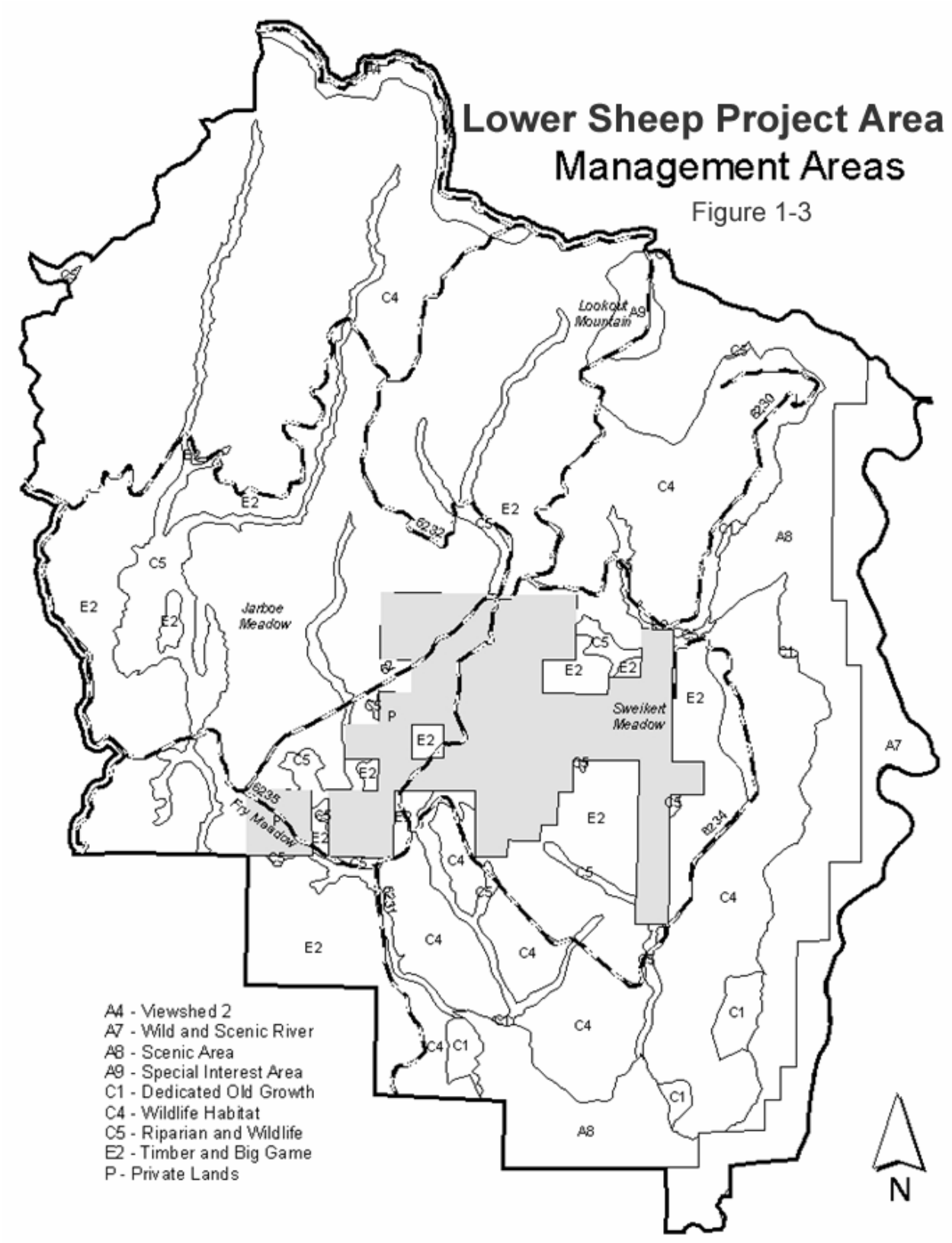
The Forest Plan identifies the type and intensity of management that may occur on Umatilla National Forest lands through designation of "management areas." These areas are shown on Table 1-1 and Figure 1-3. A summary of Standards and Guidelines for management areas can be found in Appendix A.

Table 1-1. National Forest Land Management Areas within the Lower Sheep Analysis Area

Management Area	Abbreviation	Acres
Viewshed 2	A4	325
Wild and Scenic Rivers (Amendment 7 Wallowa & Grande Ronde Rivers Final Management plan/Environmental Assessment)	A7	1,410
Scenic Area	A8	2,980
Special Interest Area (Lookout Mountain)	A9	195
Dedicated Old Growth	C1	240
Wildlife Habitat	C4	8,945
Riparian	C5	1,605
Timber and Big Game	E2	8,200
Total Forest Service		23,900

Management activities are proposed in the following Forest Plan Management Areas and would comply with their associated Standards and Guidelines:

- **C4 - Wildlife Habitat;** Goal: "Manage Forest Lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphases on size and distribution of habitat components (forage and cover areas for elk, snags and dead and down materials for all cavity users) unique wildlife habitats and key use areas will be retained or protected." *(Forest Plan, pages 4-158 through 162).*
- **E2 - Timber and Big Game;** Goal: "Manage Forest Lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat." *(Forest Plan, pages 4-182 through 186).*
- **A7 - Wild and Scenic Rivers**; Goal: "Manage classified Wild and Scenic River Segments to appropriate standards as Wild, Scenic, or Recreational River areas, as defined by the Wild and Scenic Rivers Act, Public Law 90-542, October 2, 1968 (U.S. Laws, Statues, etc. 1968), and expanded by the Omnibus Oregon Wild and Scenic Rivers


Lower Sheep Project Area
Management Areas
Figure 1-3
Lookout Mountain
Jarboe Meadow
Sweikert Meadow
Fry Meadow
6230
6232
6234
6235
6231
A4 - Viewshed 2
A7 - Wild and Scenic River
A8 - Scenic Area
A9 - Special Interest Area
C1 - Dedicated Old Growth
C4 - Wildlife Habitat
C5 - Riparian and Wildlife
E2 - Timber and Big Game
P - Private Lands
N

Act of 1988 (Public Laws 100-557). (Forest Plan pages 4-12) as amended by Forest Plan Amendment 7 Wallowa & Grande Ronde Rivers Final Management Plan/Environmental Assessment pages 61-66 for segment b, Wild section of the Grande Ronde in Oregon.

- **A8 - Scenic Area;** Goal: "Protect or enhance the unique natural characteristics of landscapes noted for their scenic beauty. *(Forest Plan, pages 4-128 to 4-130).*

Decisions to be Made

The Environmental Assessment documents the results of the environmental analysis conducted for the proposed action and its alternatives. If a Forest Plan amendment is necessary, the Forest Supervisor of the Umatilla National Forest will be the responsible official. If an amendment is not needed, the District Ranger will be the responsible official. Decisions to be made include:

1. What, if any, Forest Plan amendments are needed?
2. Whether harvest and prescribed landscape fire along with associated activities should occur, and if so, how much and where?
3. What monitoring or mitigation measures should be taken or needed?

Public Involvement

Scoping is used to identify major issues and determine the extent of environmental analysis necessary to make an informed decision. Public scoping began March 10, 2003, by mailing a proposed action to 126 individuals, groups, agencies, organizations, and tribal governments. The District received three written responses. A discussion of issues raised during scoping is included in Appendix B.

Public concerns expressed during scoping can be grouped into various resource categories listed in the Forest Plan. Chapter 4 will summarize impacts to these resources and determine consistency with Forest Plan Standards and Guidelines and various laws and regulations. Impacts to resources disclosed in Chapter 4 include:

- Fire and Fuels
- Air Quality
- Soils and Stand Productivity
- Water Quality
- Riparian and Fish Habitat
- Ecosystems and Diversity
- Wildlife Habitat
- Timber
- Transportation System
- Wild & Scenic Area – Grande Ronde
- Roadless Area and Undeveloped Areas
- Visual Quality
- Range
- Historic Preservation
- Pest Management
- Threatened, Endangered, and Sensitive Aquatic, Terrestrial, and Plant Species

Both the Nez Perce and the Confederated Tribes of the Umatilla Indian Reservation were contacted about this project and neither tribe provided input. The tribes are known to have concerns about salmon and steelhead in the Grande Ronde/Snake River systems. There is no spawning or rearing habitat for these species in the interior of the planning area. There is limited habitat a short distance up several of the

tributaries of the Grande Ronde, however, waterfalls are encountered within half to a mile and a half upstream from the Grande Ronde River. These falls are natural barriers to fish.

Significant Issues from Scoping

After a study of the public comments and resource concerns by the IDT, the District Ranger determined the following significant issues:

1. Habitat for Canada lynx;
2. Late/Old Structure Habitat and Connectivity

Significant Issues are resource or other values that drive the development of an alternative, modifies the action, or identifies "unresolved conflicts regarding uses of available resources" [NEPA sec 102(2)(E). Impacts related to the resource that generated the issue will be displayed in Chapter IV. Chapter II describes how the alternative is responsive to the issue while displaying a synthesis of impacts and values to compare alternatives.

Issue 1: Habitat for Canada lynx

The planning area is within the Timothy Lynx Analysis Unit (LAU). There is conflict with timber harvest and burning activities that could change lynx foraging and denning habitat into unsuitable habitat. The IDT recommended a Forest Plan amendment for adopting objectives, standards and guidelines from the LCAS when a proposed activity occurred in lynx habitat and also developed an alternative that avoided vegetation management activities within lynx habitat to retain the current amounts of foraging and denning habitat with the Timothy LAU. Doing so addresses and sharply defines the lynx issue relative to the purpose and need and proposed action.

- Indicators of response: acres of harvest activities within lynx habitat; percent unsuitable for lynx denning and/or foraging within the Timothy LAU; percent reduction in suitable habitat.

Issue 2: Late/Old Structure Habitat

There is a conflict between retaining all large diameter trees and late old structure and maintaining forest health and changing stand composition in late old structure habitat.

The value of late old structure Forest stands as wildlife habitat and the time it takes to develop conflicts with the silvicultural recommendation to manage stands for long term health and sustainability. The proposed thinning would focus on removal of late seral tree species that are often the species at most risk to being killed by insects, disease, and fire. The large trees of these species are often the first trees attacked by insects. The stands managed for health would have a higher composition of early seral species but would retain a component of late seral species in the overstory and understory. The stands might not reach the condition where late seral species dominate the stand's overstory however old structure habitat would still be provided. The number of large late seral tree species in the overstory of old structure stands will not change because large trees are not proposed for harvest in old structure stands. Late seral tree species would still be a component of the lower stand layers providing habitat for various resource values such as snowshoe hare and be available for future recruitment into the overstory. The overstory would remain a mix of tree species but would maintain a higher percentage of early seral species.

There is concern about the removal of large diameter trees in general. The Historical Range of Variation analysis for this project indicates that Old Forest stands are common in the Moist Forest biophysical type. The Forest Plan would allow the removal of large trees in Moist Forest because Moist Forest is within or above the Historical Range of Variation for both Old Forest Multi-Strata (OFMS) and Old Forest Single Strata (OFSS). (See Chapter 3 for a description) The project proposes the removal of a few, estimated to be less than 1 percent of the total marked trees, large trees that contribute to poor stand health conditions. There would be no removal of large trees in old forest stands. Stands determined to be old structure will remain old structure after harvest but would have their understory thinned to remove ladder fuels and increase stand resilience. Late Seral tree species would make up less of the canopy because they are the most susceptible to damage from insects and disease. The proposed harvest would not change the percent of old forest structure in the planning area

The concern for large diameter trees influenced stand harvest prescriptions. There would be no cutting of large trees in old forest stands; no matter if the stand occurs in Dry Forest or Moist Forest. There would be no cutting of large trees in dry forest, even for operational needs. To protect large trees from wildfire and insects understory trees within 30 feet would be removed. Diseased large trees in moist forest stands that are not old forest structure could be cut when they would spread disease, like mistletoe, to the remaining trees.

This issue generated Alternative C. This alternative avoids harvest in LOS stands and modifies operations to avoid damage or removal of trees larger than 21 inches in diameter.

- **Indicators of response**: Total old forest acres proposed harvest. Display expected amounts of change in forest structure and composition.

Legal Notice and Opportunity to Comment

On April 17, the District began the 30-day comment period under the June 4, 2003, CFR 215.3 and 215.5. The EA was not complete at this time; however, the responsible official determined that this was the most effective time to publish the legal notice and opportunity to comment. The document used for the comment period included the purpose and need for action, a description of alternatives, management requirements that would be applied during project implementation, a response to public concerns raised during scoping to show how the concern was addressed in the NEPA process and EA development, and a statement about adopting portions of the LCAS as a Forest Plan amendment for this project. The District received comments from one individual and three organizations; neither of the tribes responded. The comments and resource concerns have helped the District refine the analysis presented in this EA.

Chapter 2 – Alternatives

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Chapter 2 - Alternatives

Introduction

The purpose of Chapter II is to describe alternatives and explain their differences. The Interdisciplinary Team (IDT) developed alternatives to the proposed action in response to issues raised during scoping. Issues also were used to develop mitigation and management requirements. All alternatives were designed to comply with the Forest Plan as amended and meet State and Federal laws and regulations, the Vegetation Management FEIS and Mediated Agreement, and Forest Service policies.

Alternatives Considered, then Eliminated from Detail Study

The following alternatives were considered, and not pursued:

Incorporate all LCAS Chapter 7 recommendations in the Lower Sheep Project only

In response to public comment, the Forest Service considered an alternative that incorporates all of the recommendations listed in Chapter 7 of the LCAS into the Forest Plan to conserve Canada lynx. This alternative would have applied only to the Lower Sheep project.

The Forest Service chose to incorporate objectives, standards, and guidelines that were only relevant to the purpose and need and alternatives for the site-specific project called Lower Sheep Timber Sale and Fire Reintroduction Project. Incorporating management direction irrelevant to the project and scope of the decision to be made could have added unnecessary analyses and be confusing during project implementation. For example; objectives, standards, and guidelines for oil and gas leasing and livestock grazing are outside the scope of this decision. For these reasons this alternative was considered but not analyzed in detail.

Incorporate all LCAS Chapter 7 recommendations Forest-wide

In response to public input, the Forest Service considered an alternative that incorporates, forest-wide, all of the recommendations listed in Chapter 7 of the Canada lynx Conservation Assessment and Strategy (LCAS) into the forest plan to conserve Canada lynx. This alternative would have amended the plan forest-wide and remained in effect until the Forest Plan was revised.

This alternative may have addressed the project-specific purpose and need to provide management direction specific to Canada lynx, however, doing so would have required additional analysis of programmatic effects that are outside the scope of this decision. In addition, the Umatilla Forest Plan is currently being revised and expected to be approved by the end of 2007. New information about lynx and any resulting changes in management direction to conserve Canada lynx would be considered and blended within the context of the Forest Plan revision process. There is no need to duplicate the effort of the revision process in this site-specific analysis. For these reasons this alternative was considered but not analyzed in detail.

Do not rely entirely on the LCAS conservation measures to protect lynx

In response to public comment the Forest Service considered incorporating management direction for Canada lynx that differs from the conservation recommendations located in Chapter 7 of the LCAS.

The LCAS, as amended, includes a set of conservation recommendations that are based on the best currently available scientific information about lynx; risks to the species and/or individuals posed by management activities; habitat conditions; and measures that are likely needed to conserve the species. This assessment and strategy were authored by specialists representing four federal agencies including the USDI Fish and Wildlife Service. The LCAS has been reviewed and modified by the science team in response to new information, opposing views, and confusing science since it was published in 2000. Various viewpoints about lynx distribution and lynx habitat were considered by the authors of the Lynx

Conservation Assessment and Strategy (Ruediger et al. 2000). This publication along with subsequent recommendations from the Lynx Steering Committee represents the most credible and applicable synthesis of science concerning ecology and management of lynx and lynx habitat in the contiguous United States.

The LCAS states in Chapter 7-1 "These measures are provided to assist federal agencies in seeking opportunities to benefit lynx and help to avoid negative impacts through the thoughtful planning of activities. Plans that incorporate them are generally not expected to have adverse effects on lynx, and implementation of these measures across the range of the lynx is expected to lead to conservation of the species." New information about lynx and any resulting changes in management direction to conserve Canada lynx would be considered and blended within the context of the Forest Plan revision process. There is no need to duplicate the effort of the revision process in this site-specific analysis. For these reasons alternative strategies to the LCAS were considered but not analyzed in detail.

Use non-commercial thinning of small diameter trees rather than commercial harvests

This type of treatment would not work in many areas needing thinning to bring stand stocking closer to historical levels, when most stands had fewer trees per acre, a greater percentage of early seral species, larger average stand diameter, and less multistoried structure. The excess stocking in these stands includes trees over 9 inches in diameter, which adds up to approximately 25 percent to 30 percent above the recommended stocking levels. The heavy stocking in the stands makes them more susceptible to environmental stresses and thus less resistant to insects and diseases. The heavy stocking would also cause wildfire behavior to become severe in an area where historical disturbance cycles would have maintained vegetation that would experience mixed and low intensity wildfires. It would be harder to protect the private lands along the Forest boundary without removal of commercial size trees, and it would be harder to protect large diameter trees from mortality when a wildfire occurs. The proposed removal of commercial trees in the intermediate crown layer would increase the height-to-crown ratio by removing ladder fuels and would allow regeneration to play a role in meeting other resource goals, e.g. creating snowshoe hare habitat and hiding cover.

Treat using landscape prescribed fire only

Commenters sometimes ask us to consider using prescribed fire instead of timber harvest to achieve project goals. This strategy is being used in the Frequent Fire Regime within the Roadless Area on this project. However, an alternative using only fire to meet objectives on the entire project is not being pursued. We analyzed an alternative using only prescribed fire in the Eden Timber Sale and Fire Reintroduction Project Environmental Assessment, and found this treatment was not feasible when 6 to 14-inch diameter understory needs to be removed. Stands that have deviated significantly from historical fire return intervals have increased fuels and stand density; too many trees would be killed in the prescribed fire, and these dead trees would increase the risk for stand replacement events in the future.

Reduce stocking in stands providing satisfactory big game cover

Within the C4 Wildlife Habitat management area, 417 acres of stands that provide satisfactory cover for big game were identified as needing stocking reduction to maintain western larch, increase resistance to insects and disease, and maintain a mix of early and late seral tree species with a high dominance of early species to increase resilience to disturbance events. Proposing harvest in all the identified acres would reduce satisfactory cover below the Forest Plan standard of 15 percent for this allocation, which would require a Forest Plan amendment. The harvest would conflict with the Forest Plan's goal for this allocation to "Manage forest lands to provide high levels of potential habitat effectiveness for big game…" The District Ranger decided that meeting the Forest Plan standard for satisfactory cover outweighed the need of reducing stocking levels stated for this project. Therefore, all alternatives were designed to maintain 15 percent or higher satisfactory cover in C4.

Reduce fuel loads in Infrequent Fire Regimes

The need for fuel reduction focused on frequent and mixed fire regimes. During scoping, it was pointed out that heavy fuel loading is also a problem in infrequent fire regimes. Additional field review identified a high priority stand in the infrequent fire regime in need of fuel reduction treatments that included burning and would not do extensive damage to the residual stand and create higher fuel loads from the mortality. The intent was to burn the stand without harvest. Further analysis discovered that there would be a wildlife connectivity problem if the action was implemented because the stand was between existing plantations. Another area could not be identified so this alternative was not pursued further.

Implement the Units Alternative C and D have in Common

During the comment period Hells Canyon Preservation Council proposed that the Forest Service should implement a project that included the units Altlernative C and D have in common. Such an alternative would use harvest to treat 48 percent of the gross acres in Alternative B. This would reduce the amount of acres treated between the rim of the Grande Ronde canyon and the private lands. It would slow landscape changes needed to improve fire suppression efforts around the private property, to increase resilience through management of western larch, and to create or extend the amount of low fuel concentrations supportive of controlling the size of a wildfire. EA pages 4-7 to 4-10 discuss impacts to successful fire suppression and private land protection for the various alternatives. A unit in common alternative does not treat the block of acres to the north of the private lands increasing the risk for catastrophic damage along the private land boundary. This area is characterized with high risk Fuel Models at the head of Meadow Creek where it comes out of the Grande Ronde canyon. It would not block up low fuel areas in the upper planning area that would aid in controlling the size of a wildfire or increase resilience through increasing the proportion of western larch in the stands. Since this alternative further reduces the amount of acres proposed for treatment around private lands and the impacts are already displayed in this EA, this alternative is not being considered in further detail.

Proposed Action used for Scoping

Additional field review, analysis, and public commented caused the proposed action to be modified as described in Alternative B. The following changes were made:

New Harvest Unit Silviculture Prescriptions

In addition to Improvement cuts and Group Selection, the following prescriptions were added to the Modified Proposed Action: Commercial Thinning, Individual Tree Selection, Shelterwood Seed Cut, Seed-Tree Seed Cut.

Changes to Harvest Units, for an overall reduction of 866 acres

Some harvest units were removed from management area C4 to comply with Forest Plan Standards and Guidelines for satisfactory cover. Another unit was dropped because there was a Region 6 sensitive plant population inside of it. All proposed units that contained pine plantations not adapted to the site were removed because entry into these old harvest units would cumulatively add to soil compaction, which would not meet Forest Plan Standards and Guidelines. Lastly, an experimental treatment originally proposed to improve lynx habitat was dropped due to an improved understanding of what is good for lynx.

Unit #90 was added to the west of #43, to create a separate unit from fingers of Unit #43 that extended west of Road 62. These fingers plus some more area to the west of them were delineated as Unit #90 in the modified Proposed Action.

Dropped Fuels Reduction Areas #3 and #5

The harvest unit in Area #3 was removed to help maintain satisfactory wildlife cover. This unit was to have been the main fuels treatment within Area #3; without it there was no reason for fuel reduction treatments.

C1-Dedicated Old Growth occupied most of Area #5. After analysis it was determined that direct ignition within this area might not maintain or enhance old growth characteristics, so Area #5 was not included in the modified Proposed Action.

Added Fuels Reduction Area #118

In order to better meet the purpose and need to reduce wildfire severity at the private land boundary, Fuels Reduction Area #118 was added to all alternatives. Existing non-commercial thinning slash would be treated by mastication.

Description of Alternatives

Alternative A: No Action

Alternative A is the "no action" alternative required by the National Environmental Policy Act of 1969. It represents the existing situation, uses, and environmental processes. No new management actions would take place. Current management direction and existing activities such as grazing, fire protection, and road maintenance would continue. Current biological and physical processes, creating stand disturbance and change, would continue. This alternative serves as a base line to compare the differences and effects of the Proposed Action.

Alternative B: Modified Proposed Action

The Modified Proposed Action utilizes a combination of timber harvest and fuel reduction activities. Landscape prescribed fire and hand piling would be used to restore landscape character of the frequent fire regime within and along the rim of the Grande Ronde Canyon. Timber harvest would be used to increase the dominance of early seral tree species within stands and increase the ease of fire suppression around interior private lands. All other alternatives are a subset of the modified proposed action.

Specific goals of this alternative are to:

- Restore the historic the landscape character of the frequent fire regime found within the Grande Ronde canyon using landscape prescribed fire and hand piling and burning of piles while conserving the values of the Grand Ronde Scenic River corridor and the Inventoried Roadless Area.
- Increase to dominance of early seral tree species (like western larch) and stand vigor so the stands would be resilient to insects, disease and wildfire. This includes treatments designed to protect large trees from catastrophic damage.
- Provide products or work in support of local community economic development.
- Reduce the cost, losses, and damage caused by wildland fires by increasing the ease of fire suppression capability around interior private lands including fire fighter and public safety.
- Reduce the risk of disease infecting developing stands. Diseased trees would be cut, including large trees (greater than 21 inches), around group selections being used to re-establish western large in the understory.
- Increase stand resilience to low intensity wildfires in the infrequent and mixed frequency severity fire regimes.

Table 2-1 summarizes the harvest acres and volumes and landscape treatments within timber harvest for Alternative B.

Table 2-1. Summary of Alternative B (mbf = thousand board feet)

Harvest Acres		1,812
Harvest Volume (mbf)		9,853
Harvest systems (acres)	Forwarder	1,728
	Skyline	84
	Helicopter	0
Non-Harvest Fuels Treated (acres)		2,804

The map on page 2-32 displays the activities associated with Alternative B.

Fuel Reduction Activities

Fuel reduction treatments would occur on a landscape scale in six Fuel Reduction Areas. They also would occur within harvest units, as slash treatments, outside of these Fuel Reduction Areas. Some timber harvest would take place within the Fuel Reduction Areas. Table 2-2 summarizes proposed fuel reduction activities.

Table 2-2. Summary of Fuel Reduction Activities, Alternative B

Treatment Type	Acres
Landscape Burning outside of Harvest Units	2,763
Harvest Residue Burning	516
Total Prescribed Burning	**3,279**
Mechanical treatment outside Harvest Units	41
Mechanical treatment inside Harvest Units	1,242
Total Mechanical Harvest	**1,283**
Combined Mechanical and burn treatments inside Harvest Units	54
Total of all fuel treatment	**4,616**

Landscape Fuel Treatments:

Underburning, mechanical treatment, or a combination of underburning and mechanical treatment (including timber harvest on 217 acres), would be used in Fuel Reduction Areas.

Fuel Reduction Areas were identified to create conditions that would aid in the control of wildfires. Most of this work could be done without the need of timber harvest. Removing the ladder fuels and reducing surface fuel would provide defensible areas to control the size and intensity of a wildfire. Approximately 30 percent of the Fuel Reduction Areas are in Condition Class 1 (areas that have not departed significantly from historic disturbance cycles). Treatments in Condition Class 1 would be used to maintain stand structure. Approximately 70 percent of the Fuels Reduction Areas are in Condition Class 2 and 3 (areas that have departed significantly from historic disturbance cycles). Treatments in Condition Class 2 and 3 would include removal and sale of merchantable trees prior to prescribed burning the understory, except in Fuel Reduction Area 8. Hand piling and burning would be used to thin the understory and reduce ladder fuels. In some locations the non-commercial trees and slash would be scattered to carry the prescribed fire.

Underburning would occur in the fall for stands managed for ponderosa pine. It is estimated to take 2 to 3 burning entries over a period of 15 years to achieve the desired result. The proposed burning in the Dry

Forest within the Grande Ronde canyon would lower fuel loads and reduce small understory trees that contribute to ladder fuels. Future prescribed fires could be proposed once the trees killed by this prescribed fire fall to the ground. The future burning would occur under drier conditions, consuming additional fuels and modifying vegetative structure and composition, reducing grand fir and Douglas-fir in the understory. The resulting stand conditions would:

- Have a thinned canopy reflective of the character historic to the frequent fire regime.
- Have reduced ground and ladder fuels, which would reduce the risk for crown fires
- Be more resilient to a late summer wildfire
- Increase the success of suppression efforts

Landscape Fuel Treatments would involve a combination of the following activities:

- **Fireline construction**: Blackline Most fire control line would be developed using hand ignitions to widen the defensible area along natural breaks in the slope. Work would be consistent with PACFISH requirements; refer to Appendix E.
- **Ignition**: the burning of piles and construction of blacklines would be done by hand ignition. Aerial ignition methods would be used over the majority of the area, outside of harvest units, when a total of 500 acres or more is planned for ignition during any burn window. Aerial ignitions use a Plastic Sphere Dispensing Machine (PSDM). The machine inserts antifreeze when the balls are dropped, which causes a chemical reaction that ignites the balls after they fall. A gallon of antifreeze is used per 1,000 spheres and 5 to 7 spheres are used per acre. No mixing or preparing of fuels would occur in the planning area. Fuel needed for hand ignitions would be mixed prior to reaching the area. Ignitions would be consistent with PACFISH, Appendix E and management requirements dealing with fuel found later in this chapter.
- **Helispots**: A landing near the burn units would be used for fueling the helicopter and refilling the PSDM. Fuel for the helicopter would not be stored on site. Roads or rock sources would be used as Helispots, outside of RHCAs.
- **Mop-up**: Mop-up would occur when fire creep would cause unacceptable mortality to leave trees. Within forested RHCAs and Management Area C1.
- There would be no ignitions but fire would be allowed to creep into these areas.
- Fire severity in forested RHCAs would be kept within the non-lethal severity for 90 percent or more of the affected area;[1] and no more than 5 percent of the affected area would be in a lethal fire severity.[2]
- **Drafting**: Ponds and streams would provide fall and spring water sources for fire mop-up/control needs.

Harvest Residue Treatment: Table 2-3 summarizes fuel treatments planned within Harvest Units. A variety of methods would be used to reduce post-harvest fuel loads.

- **Jackpot burning** uses spot ignitions to remove only the heavier fuel concentrations.

[1] Non-lethal severity is defined as more than 90 percent of the canopy cover or 70 percent of the basal area survives the burn.

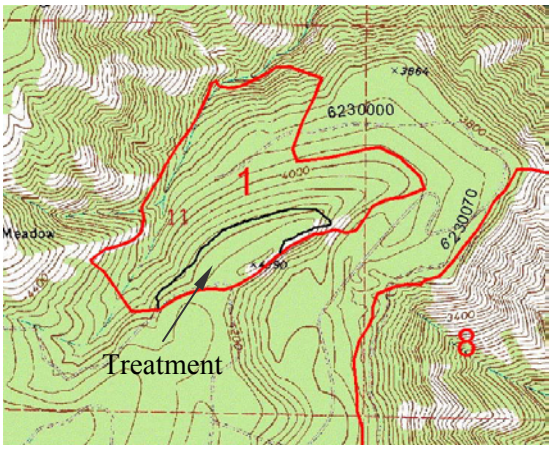
[2] Lethal (Stand-replacement) severity is less than 10 percent of the canopy cover or less than 20 percent of the basal area of the overstory vegetation remains after the fire.

- **Under burning** would apply low intensity fire to a broad area to shape stand species composition and structure while reducing surface and ladder fuels.
- **Machine mastication** would occur in stands with species that are not fire-tolerant or where underburning would cause high mortality. A portion of the small, live trees and harvest residues would be masticated. Mastication refers to a mechanized process that breaks up surface fuels into "chips" that are left to decompose.
- **Yarding of Unmerchantable Material (YUM)** would be done on steep units containing non-fire-tolerant species. This treatment would remove treetops and large dead material (normally left in the unit) by suspending them from skyline cables to reduce soil disturbance.

Stands would be evaluated after harvest to determine if fuels have been rearranged or reduced enough to not warrant further treatment. Units with heavy logging residues could be burned in the spring. If needed, a follow-up burn in the fall could then be implemented to better mimic natural fire conditions.

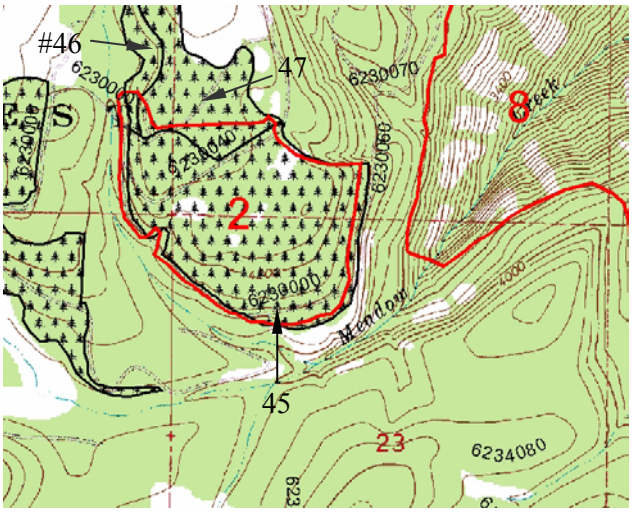
Table 2-3. Summary of Fuel Treatments within Harvest units

Fuel Treatment	Acres
Jackpot (JP)	432
Jackpot/Mastication (SB)	54
Mastication	1,226
Underburn	24
Underburn/Jackpot	60
YUM	16
Total	**1,812**



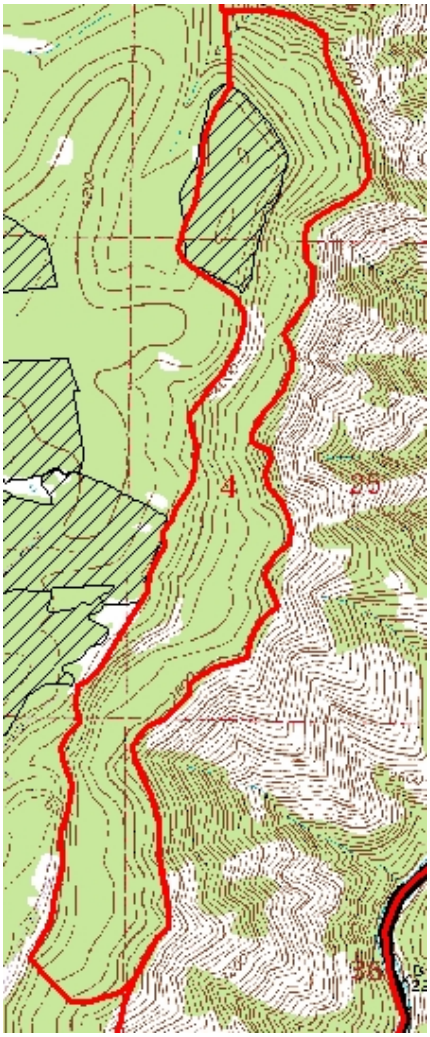
Fuel Reduction Area 1 (159 acres): Only 23 acres of hand piling and burning are proposed within this area. The stand is in the Mixed Fire Regime with open character.

The fuel treatment would reduce fuel loads, maintain open stand conditions, and restore historical forest composition and structure. Fire exclusion has created high stocking/loading conditions, such that pre-burn treatment is needed before fire can be reintroduced. Non-commercial size trees and brush would be cut by hand (chain saws), piled by hand, and burned in the fall after the debris had cured.



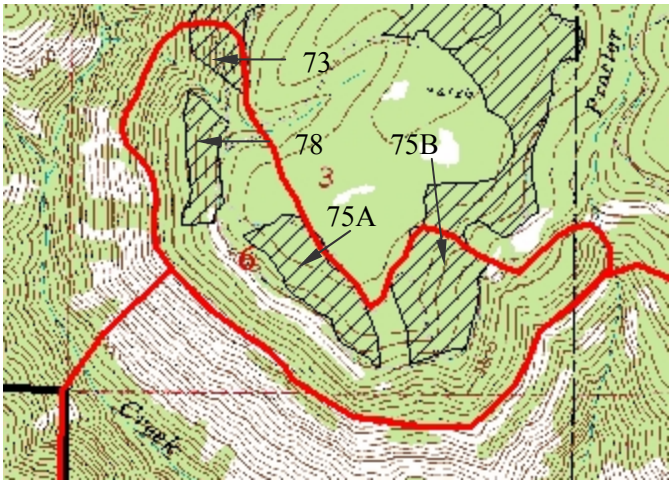
Fuel Reduction Area 2 (122 acres): Area 2 sits on a large bench north of Meadow Creek in a strategic location for controlling a fire coming out of the Meadow Creek canyon. It consists entirely of harvest units; Harvest Unit #45 (a commercial thinning) and small **southern** portions of Units #46 and #47 (commercial thin/improvement cuts). The whole Fuel Reduction Area is in the Mixed Fire Regime.

The proposed treatments would reduce fuel loads and maintain open stand conditions to begin restoring historical forest composition and structure. Treatment of the commercial size trees is needed before fire can be reintroduced because of high stocking levels and the amount of fire intolerant species. Most of the unit would then be jackpot burned. The northern portion may have some mastication of fuels instead of burning.



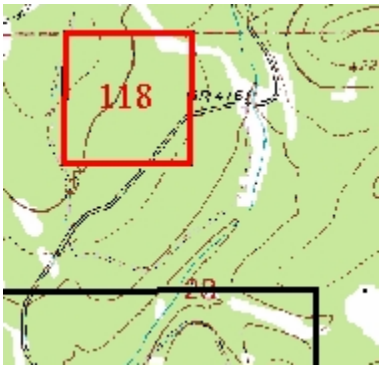
Fuel Reduction Area 4 (283 acres): The area is part of a long narrow bench that drops off sharply to the east into the Grande Ronde River. Harvest Unit #58 (a 40-acre prescribed shelterwood/ commercial thinning) is proposed in this area. The remainder of the area, outside the harvest unit, occurs in an Inventoried Roadless Area. Like most stands along the rim it is composed of grand fir, Douglas-fir, western larch, and ponderosa pine. There are groups of small diameter (<10 inch) larch separating clumps of 20+ inch diameter of mixed species, including grand fir. The reduction area falls within the Mixed Fire Regime.

The objective of treatment in Area 4 is to maintain most of the area in Condition Class 1. Harvest residue would be treated by mastication. Treatments outside the harvest unit would include prescribed fire, with hand pre-treatment and piling of standing and down dead material. Piles would be burned in the fall. The burning would be applied by aerial or hand ignition along project boundaries.



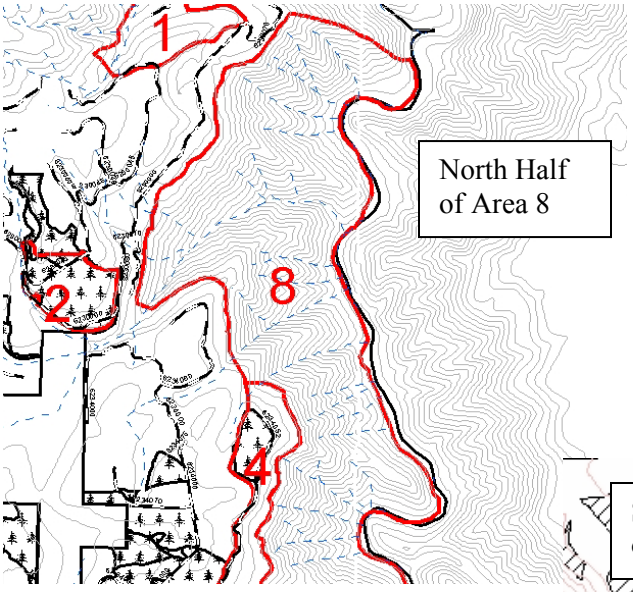
Fuel Reduction Area 6 (195 acres): This area is located on the slope breaking off into Sheep Creek to the west and south, and Proctor Creek to the southeast. Harvest Unit 78, parts of Unit 73, and 75A and B comprise about 56 acres of the area. It is located in the Frequent Fire Regime and is in Condition Class 2.

The objective of harvest and prescribed fire in this area is to re-introduce fire as a disturbance mechanism on the landscape, beginning the return to Condition Class 1. Multiple prescribed burns over time would be required to achieve this. The area outside of the harvest areas would be burned by aerial or hand ignition during the fall**.**



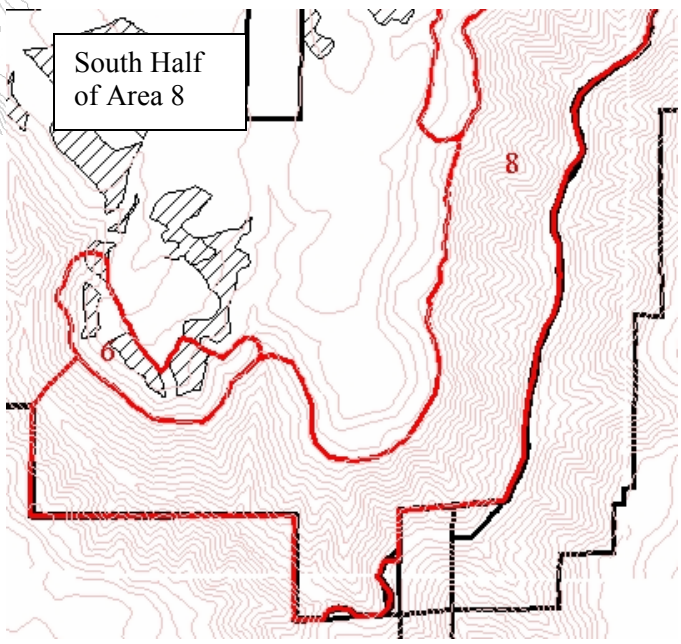
Fuel Reduction Area 118 (41 acres): This area is a small part of a forested plateau that forms the headwaters of Sheep Creek and Fry Creek. It is entirely surrounded by private land. It and the adjacent lands were non-commercially thinned within the last 10 years. **The area is in the Mixed Fire regime.**

The objectives would be to reduce fuels to a level that would aid in wildfire suppression efforts, and to reduce fire severity along the private lands boundary. The old thinning slash within the Fuel Reduction Area would be treated by mastication.



Fuel Reduction Area 8 (3,428 acres): This area is located along the west slopes of the Grande Ronde River and the north slopes of Sheep Creek. It is within the Grande Ronde Inventoried Roadless Area and Grand Ronde Wild & Scenic River Corridor. There are 2,343 acres in the Frequent Fire Regime.

The objective is to maintain existing stands and restore them to a normal fire return interval. Only prescribed fire is proposed; there would be no harvest or other mechanical fuel treatments. Ignition would take place by aerial or hand methods.



Proposed Timber Harvest

Table 2-4. Summary of Prescriptions, Alternative B

Prescription	Total Acres	Volume (mbf)
Commercial Thinning	1,420	7,753
Improvement Cut	82	362
Group Selection (Gross Acres)	169	576
Individual Tree Selection	82	518
Shelterwood	53	582
Seed Tree	6	60
Total	**1,812**	**9,853**

Table 2-5. Summary of Prescriptions in Old Forests, Alternative B

(only trees smaller than 21" in Moist Forest; there is no harvest in Dry Forest Old Forest. All acres would continue to meet the definition of Late Old Structure.)

Prescription	Old Forest Multistrata	Old Forest Single stratum	Total acres
Commercial Thinning	320	69	389
Improvement Cut	53	15	68
Group Selection (Gross Acres)	113	0	113
Total	**486**	**85**	**570**

Silviculture Prescriptions: A full range of silvicultural methods was considered to respond to the purpose and need. Methods selected were intermediate harvest cutting, uneven-aged harvest cutting, and even-aged harvest cutting. If there would be significant benefits to the health of the remaining stand, trees larger than 21 inches dbh were considered for removal from Moist Forests, where stands are within Historic Range of Variability (HRV). In addition to harvest cutting, prescribed burning was considered to reduce fuel and stocking levels. Table 2-4 summarizes the timber harvest prescriptions for Alternative B. See Appendix C for a summary of harvest units.

Intermediate harvest cutting methods are designed to leave a fully stocked stand after harvest.

Thinning (HITH Commercial thinning) reduces the stocking level to a recommended stocking level for each plant association, and when combined with post-harvest fuels treatment, can reduce the chance of a surface fire becoming a crown fire. Diseased, suppressed, or deformed trees are preferentially removed. Depending on the site, there may be a species preference for leave trees. Thinning that produces merchantable material is called commercial thinning.

Improvement cutting (HIIM) is an intermediate cutting made in stands past the sapling stage for the purpose of improving their composition and quality by removing trees of undesirable species, form, or condition from the main canopy.

Uneven-aged harvest cutting methods leave an uneven-aged stand after harvest. The prescriptions depend on the stand conditions at the time of treatment:

Individual tree selection harvest (HSEI) removes selected trees from certain size or age classes over an entire stand area. The resulting stand structure is a mixture of tree sizes and/or ages.

Group selection harvest (HSEG) removes small groups of trees, creating openings of up to 2 acres. Post-harvest fuel treatment is confined (to the extent possible) to the harvested openings. The resulting stand structure is patches of young trees with mature trees around them.

Implementing silvicultural prescriptions in Alternative B would result in cutting approximately 40 trees over 21" in diameter. These trees are located within 12 units where group selections are prescribed, at an estimated frequency of 1 tree per 5 acres. The prescription calls for cutting those trees with mistletoe that are within or immediately adjacent to small scale (2-3 acre) patch cuts, where young trees within the regenerated area would become infected.

Even-aged harvest cutting methods are designed to open stand canopies to sunlight in order to allow new conifer seedlings to establish, by natural germination and/or planting, and grow rapidly. Some regeneration harvest prescriptions are designed to open an entire stand, while others are designed to create smaller openings within a stand. This type of harvest usually temporarily increases the amount of grass and forb vegetation available for animal forage, moving the harvested stands to an earlier seral stage. Post-harvest fuel treatment can help decrease the risk of future high intensity fires. On this project, regeneration was prescribed in stands where many of the trees are in poor condition, making intermediate or uneven-aged cuttings inappropriate. Tree larger than 21 inches may be removed from the stands when they present a high risk mistletoe source to the developing understory.

In many cases, it is desirable that the majority of new seedlings be of early seral, sun loving species, because those species tend to be more resistant to insects, disease, and fire than late seral species. Studies of forest conditions from before fire exclusion was widespread indicate that early seral species used to be much more dominant in the Blue Mountains landscapes.

Shelterwood method (HSSW) may be used in mature stands where sufficient desirable overstory seed and shade trees exist, and provides the advantages of even-aged methods while providing shelter for the replacement stand. The overstory shelterwood trees would be dedicated for wildlife and other resource values. After harvest is completed, a portion of the remaining overstory is expected to be killed by prescribed fire or windthrow, creating snags and down woody material. The new stand, either from natural germination or planting, is expected to have a high proportion of western larch as it is a primary early seral species on these sites.

Seed tree method (HSST) may be used in stands that contain a sufficient number of desirable trees to produce some seed but not enough good leave trees for a shelterwood. This method would be similar to the shelterwood method but would leave fewer overstory trees.

Timber harvest would involve combinations of the following activities:

- **Tree Felling**: Mechanical felling with a processor would occur in forwarder units and hand felling in skyline units.
- **Forwarder Logging System**: A ground-based, full suspension system for harvesting, which carries the logs out of the harvest unit.
- **Skyline Logging System**: The skyline systems would provide partial suspension for logs except in Unit #21 and Unit #22. These two units would require logs to be fully suspended across the riparian area.
- Forwarder landings and skyline landings would be located along the road right-of way; no construction would be needed.
- Forwarder route spacing would be approximately every 40 feet.
- Skyline corridors would be approximately 16 feet wide. Tailholds would be space 150 feet for parallel settings and 200 feet for occasional fan settings.

- **Harvest Residue Treatment**: See Unit summary in Appendix C
- **Reforestation**: Actions would include collection of native seeds and hand planting of trees. Tree planting would occur on up to 104 acres.
- **Erosion control:** Standard methods would be utilized including native seed to restore disturbed soil, waterbars, and scarification.

Transportation System and Access Management

Access for crew and support vehicles would be needed. Fuel for heavy equipment and light hand equipment would be hauled to the site each day. The following activities would be associated with access.

Road Reconstruction and Maintenance: Maintenance would be performed to protect the existing road surface, remove hazard trees that could fall on access routes, and prevent future damage by improving drainage, replacing culverts and surface rock. Brushing would occur where there is a need for public safety. Traffic control measures would be taken when actions occur next to roads. Maintenance would be performed on access roads using standard specifications as described below:

- Standard maintenance would occur on 56.3 miles of Forest Roads.
- Shaping, blading and surface rocking would occur on 1.8 miles of the 62 road, 1.2 miles of the 6235 road and 4.7 miles of the 6231 road.
- There would be 3.4 miles of roadside brushing.
- Forest Road 6231 would have 2 culverts removed and replaced and 2 new culverts added for overflow and ditch relief.

Temporary Road Construction: There would be approximately 2 miles of temporary road construction to access Harvest units # 66, #80, #47, #30. These roads would be decommissioned and revegetated with native seed after once harvest is completed.

Reopening Closed Roads: Consistant with the Access and Travel Management Plan, eighteen roads would be reopened to access treatment areas, for a total of 17.8 miles. These roads would be closed again at the end of the project.

Dust Abatement: Dust abatement is expected to be only occasionally required because it is needed for public safety only when more than eight loads per day are hauled. Forwarder logging normally requires fewer hauls. Water would be the primary method of abatement. Six water sources are approved for dust abatement and shown on the project map. Magnesium chloride may be used on haul routes outside of PACFISH RHCA's.

Rock Sources: Two rock sources would be used. See project map for rock locations. The rock source in Section 10 off Forest Road 6200390 would need some tree removal. Expansion would be less than one acre.

Forest Plan Amendment

The Umatilla National Forest Land and Resource Management Plan would be amended to incorporate objectives, standards, and guidelines for Canada lynx. Objectives would be incorporated into the Forest Plan on page 4-29, below Table 4-10 and above the paragraph starting with "Biological evaluation…" Standards and guidelines would be incorporated into the Forest Plan on page 4-91; bottom of the page, following Peregrine Falcon Habitat, with a heading for Canada lynx. The amendment would apply only for the duration of, and to those actions proposed in lynx habitat for the site-specific project called Lower

Sheep Timber Sale and Fire Reintroduction Project. See Appendix F of this EA for a description of the proposed objectives, standards, and guidelines.

Alternative C: No Harvest in Late Old Structure Alternative or Cutting of Trees Larger than 21 Inches.

This alternative responds to Key Issue #2 about concerns for harvest in Late Old Structured stands (LOS) and cutting large trees. The Alternative would accomplish the same goals as Alternative B but would drop units proposed for harvest in LOS and be designed to not cut any trees larger than 21 inches. This alternative is the same as Alternative B, including the amendment for lynx conservation. Alternative C differs from Alternative B by:

- Proposing no harvest or direct fire ignitions in LOS. See Appendix C for a list of units.
- Avoiding the cutting trees over 21 inches. Helicopter logging systems would be substituted for skyline systems to avoid the need to cut trees larger than 21 inches in skyline corridors.
- Reducing the scope of the actions connected to harvest treatment such as harvest residue fuel treatments and road use.

There would be approximately 600 fewer acres of harvest by not harvesting in stands of Late Old Structure. The proposed harvest with this alternative is summarized in Table 2-6.

Table 2-6. Summary of Alternative C (mbf = thousand board feet)

Harvest Acres		1,208
Harvest Volume (mbf)		6,244
Harvest systems (acres)	Forwarder	1,124
	Skyline	0
	Helicopter	84
Non-Harvest Fuels Treated (Acres)		2,804

See map on Page 2-34 displaying the activities associated with Alternative C.

Fuel Reduction Activities:

Activity generated slash inside of harvest units would be treated as described in Alternative B; because there are fewer units, there would be less treatment. The treatment of landscape fuels (fuels outside of harvest units) would be the same, except for changes in Fuel Treatment Areas 2 and 4, where large trees would not be removed. Table 2-7 summarizes the acres proposed for slash and landscape fuel treatments.

Table 2-7. Summary of Fuel Reduction Activities, Alternative C

Treatment Type	Acres
Landscape Burning outside of Harvest Units	2,763
Harvest Residue Burning	332
Total Prescribed Burning	**3,095**
Mechanical treatment outside Harvest Units	41
Mechanical treatment inside Harvest Units	876
Total Mechanical Treatment	**917**
Combined Mechanical and burn treatments (inside Harvest Units)	0
Total of all fuel treatment	**4,012**

Landscape Fuel treatments: The Fuel Reduction Areas would use underburning or a combination of underburning and mechanical treatment, including timber harvest (186 acres), to reduce fuels. Fuel Reduction Areas would be treated as described under Alternative B (including connected activities) except in Fuel Reduction Area 2 and Fuel Reduction Area 4, which would be treated as follows:

- Fuel Reduction Area 2 (122 acres)**:** The small slivers of Units 46 and 47 were dropped because these stands are Late Old Structure. Harvest Unit #45, a 112 acre commercial thinning, is the only proposed harvest needed in this area.
- Fuel Reduction Area 4 (283 acres): Harvest Unit #58, a shelterwood/ commercial thinning, has been reduced from 40 acres to 18 acres to remove the Late Old Structure portion of the original unit.

Harvest Residue Treatments (Including Harvest Units within Fuel Reduction Areas): Table 2-8 below summarizes the fuel treatments planned for all the harvest units. Harvest residue would be treated using a variety of methods to reduce post-harvest fuel loads. Yarding unmerchantable material would be by helicopter on Alternative C. See Alternative B for a discussion on fuel treatment methods.

Table 2-8. Summary of Harvest Unit Fuel Treatments for Alternative C

Fuel Treatment	Acres
Jackpot (JP)	264
Jackpot/Mastication (SB)	0
Matication	860
Underburn	24
Underburn/Jackpot	44
Yum (by Helicopter)	16
Total	1,208

Timber Harvest

Forest management goals for this alternative would be the same as Alternative B except where achieving them would require the cutting of trees larger than 21 inches or the harvest of late old structure stands. A summary of the proposed prescriptions is listed in Table 2-9 and Table 2-10.

Table 2-9. Summary of Harvest Prescriptions, Alternative C:

Prescription	Total Acres	Volume (mbf)
Commercial Thinning	1,006	4,920
Improvement Cut	25	106
Group Selection (Gross Acres)	47	555
Individual Tree Selection	82	203
Shelterwood	42	419
Seed Tree	6	39
Total	1,208	6,244

Table 2-10. Summary of Harvest Prescriptions by Old Forest, Alternative C

(Note that Old Forest Structural Stages are not entered for harvest.)

Prescription	Old Forest Multistrata	Old Forest Single stratum	Total acres
Commercial Thinning	0	0	0
Improvement Cut	0	0	0
Group Selection (Gross Acres)	0	0	0
Totals	0	0	0

Timber harvest activities would be the same as for Alternative B, except:

- **Helicopter**: Where skyline logging systems were identified in Alternative B, a full suspension, helicopter logging system would be used. See unit summary in appendix C.
- **Helicopter Service Landing:** All helicopter landings, for logs and service, would be outside of Riparian Habitat Conservation Areas (RHCAs) and would be located on previously disturbed sites such as rock sources, old landings, or road intersections. Fuel would normally be stored on site for the helicopter and the contract would require construction of a facility that would contain an accidental spill. Logs would be decked (piled for transport) at several wide locations along existing roads. When one site fills with logs, the helicopter would move to another site until the logs are hauled and the site again becomes available for decking. The helicopter would move between multiple drop points while the logs are being hauled. This would help confine use to existing roads without constructing a landing or expanding them into scablands. Helicopter yarding would most likely occur in late spring or in the fall when available moisture would keep the road surface hard.

Transportation System and Access Management

Transportation activities would be the same as for Alternative B, except:

- Standard maintenance would occur on 52.1 miles of Forest Roads.
- There would be 2.6 miles of roadside brushing.
- There would be 0.7 miles of temporary road construction on Harvest units #21, #66 and #30.
- Sixteen closed roads would be opened for a total of 17.2 miles. These roads would be closed again at the end of the project.

Alternative D: No Harvest in Lynx Habitat

This alternative responds to Key Issue #1, the concern about harvest in lynx habitat, by dropping the harvest proposed in lynx habitat. This alternative is the same as Alternative B. Alternative D differs from Alternative B by:

- Not needing a Forest Plan amendment because activities are not proposed in lynx habitat.
- Reduced harvest acres are fewer acres of slash treatments and less miles of road used.

Alternative D has 18 fewer Harvest Units and approximately 700 fewer acres than Alternative B. See Appendix C for a unit summary.

Table 2-11 summarizes the proposed harvest acres and volumes and landscape treatment acres included in Alternative D.

Table 2-11. Summary Alternative D (mbf = thousand board feet)

Harvest Acres		1,090
Harvest Volume (mbf)		5,948
Harvest systems acres	Forwarder	1,069
	Skyline	21
	Helicopter	0
Non-Harvest Fuels Treated (acres)		2,804

See map on Page 2-35 displaying the activities associated with Alternative D.

Fuel Reduction Activities

Summary of Fuel Treatments: Fuel inside of harvest units would be treated as described in Alternative B; because there are fewer units, there would be less treatment. The treatment of landscape fuels (fuels outside of Harvest Units) would be the same as well. However, there would be fewer total acres of fuel treatments because of less proposed harvest acres. Table 2-12 summarizes the total acres outside and inside of all harvest units that would have fuel treatments.

Table 2-12. Summary of Fuel Reduction Activities, Alternative D

Treatment Type	Acres
Landscape Burning outside of Harvest Units	2,763
Harvest Residue Burning	298
Total Prescribed Burning	**3,061**
Mechanical treatment outside Harvest Units	41
Mechanical treatment inside Harvest Units	792
Total Mechanical Treatment	**833**
Combined Mechanical and burn treatments inside Harvest Units	0
Total of all fuel treatment	**3,894**

Landscape Fuel treatments: The Fuel Reduction Areas would be treated the same as described in Alternative B (including connected activities). This would include the harvest units that are within the Fuel Reduction Areas (see Alternative B for a description of Fuel Reduction Areas).

Harvest Residue Treatments (including Harvest Units within Fuel Reduction Areas): Table 2-13 summarizes the fuel treatments planned for all the Harvest Units. Neither combined Jackpot and Mastication, nor Yarding of Unmerchantable Material would occur under this alternative. Harvest residues would be treated using a variety of methods to reduce post-harvest fuel loads. See Alternative B for a discussion on fuel treatment methods.

Table 2-13. Harvest residue treatment by fuel prescription.

FuelTreatment	Acres
Jackpot (JP)	214
Jackpot/Mastication (SB)	0
Mastication	792
Underburn	24
Underburn/Jackpot	60
Yum	0
Total	**1,090**

Timber Harvest

Forest management goals for this alternative would be the same as Alternative B except where achieving them would require harvest within lynx habitat. Note that no lynx habitat is proposed for harvest or fuel reduction with this alternative.

Reducing harvest would also reduce the scope of the actions connected to harvest treatment, such as treating harvest residues, as displayed in Tables 2-12 and 2-13. Silvicultural goals and treatments are described on page 13 of this chapter. A summary of the prescriptions is listed in Table 2-14 and Table 2-15.

Table 2-14. Summary of Prescriptions, Alternative D

Prescription	Total Acres	Volume (mbf)
Commercial Thinning	861	4,430
Improvement Cut	60	68
Group Selection (Gross Acres)	28	518
Seed Tree Cut	6	288
Shelterwood Cut	53	582
Individual Tree Selection	82	60
Total	**1,090**	**5,948**

Table 2-15. Summary of Harvest Prescriptions by Old Forest, Alternative D

(Moist Forest only, there is no harvest in Dry Forest Old Forest Structural Stage)

Prescription	Old Forest Multistrata	Old Forest Single stratum	Total acres
Commercial Thinning	91	22	113
Improvement Cut	9	37	46
Group Selection (Gross Acres)	16	0	16
Totals	**116**	**59**	**175**

Timber harvest activities would be the same as for Alternative B, except that:

- **Skyline**: The skyline systems would use partial suspension. Since there are no riparian areas involved, full suspension would not be required in this alternative.
- **Landing rehabilitation**: Landings would not be constructed; designed road widths would provide adequate room to operate skyline equipment.

Transportation System and Access Management

Transportation and access activities would be the same as for Alternative B, except that:

- Standard maintenance would occur on 34.9 miles of Forest Roads.
- There would be 2.6 miles of roadside brushing.
- There would be 1.1 miles of temporary road construction on Harvest units #66 and #47.
- Ten closed roads would be opened for a total of 7 miles. These roads would be closed again at the end of the project.

Alternative E: Improved Suppression around Private Land Only

This alternative narrows the focus for treatments to those that would reduce fire intensity and improve the ability to successfully suppress wildfires along the private land boundary; no actions are proposed for private land. Some of the respondents questioned the need for fuel treatments when there is no Wildland Urban Interface near the project area. The Lookingglass WUI is about 3 miles southwest of the planning area boundary. The large portion of interior private lands with cabins provides a need to focus treatments in this area. The broader forest health objectives that include maintaining early seral tree species that do not also provide protection to the private lands would be dropped. This alternative is the same as Alternative B, including the lynx amendment. Alternative C differs from Alternative B by:

- Fewer acres of slash treatments and fewer miles of road used because of reduced harvest acres.
- Not thinning in stands that are overstocked and not needed to improve fire suppression efforts around the private lands.
- There would be approximately 720 fewer acres of harvest than Alternative B, see Appendix C for a Unit Summery.

Proposed harvest treatments are summarized in Table 2-16.

Table 2-16. Summary Alternative E (mbf = thousand board feet)

Harvest Acres		1,108
Harvest Volume (mbf)		5,748
Harvest systems acres	Forwarder	1,087
	Skyline	21
	Helicopter	
Non-Harvest Fuels Treated (acres)		2,804

See map on Page 2-36 displaying the activities associated with Alternative E.

Fuel Reduction Activities

Summary of Fuel Treatments: Proposed slash treatments inside of harvest units would be the same as described in Alternative B. The treatment of landscape fuels (fuels outside of Harvest Units) would be the same. Table 2-17 summarizes the total acres outside and inside of all harvest units that would have fuel treatments.

Table 2-17. Summary of Fuel Reduction Activities, Alternative E

Treatment Type	Acres
Landscape Burning outside of Harvest Units	2,763
Harvest Residue Burning	241
Total Prescribed Burning	**3,004**
Mechanical treatment outside Harvest Units	41
Mechanical treatment inside Harvest Units	867
Total Mechanical Treatment	**908**
Combined Mechanical and burn treatments inside Harvest Units	0
Total of all fuel treatment	**3,912**

Landscape Fuel treatments: Fuel Reduction Areas would be treated as described under Alternative B, including the harvest units that are within them. For a description of Fuel Reduction Areas see the discussion under Alternative B.

Harvest Residues Treatment (Including Harvest Units within Fuel Reduction Areas): Table 2-18 summarizes the fuel treatments planned for all the harvest units. Harvest residues would be treated using a variety of methods to reduce post-harvest fuel loads. See Alternative B for a discussion on fuel treatment methods. Neither combined Jackpot and Mastication, nor Yarding of Unmerchantable Material would be required under this alternative.

Table 2-18. Harvest residue treatment by fuel prescription.

Fuel Treatment	Acres
Jackpot (JP)	157
Jackpot/Mastication (SB)	0
Mastication	867
Underburn	24
Underburn/Jackpot	60
Yum	0
Total	**1108**

Timber Harvest

Silvicultural goals and treatments are described on page 13 of this chapter. A summary of the prescriptions is listed in Table 2-19 below.

Table 2-19: Summary of Prescriptions, Alternative E

Prescription	Total Acres	Volume (MBF)
Commercial Thinning	834	4,116
Improvement Cut	73	327
Group Selection (Gross Acres)	60	145
Individual Tree Selection	82	518
Shelterwood	53	582
Seed Tree	6	60
Total	**1,108**	**5,748**

Table 2-20. Summary of Prescriptions for Old Forest, Alternative E

(Moist Forest only; there is no harvest in Dry Forest Old Forest Structural Stage)

Prescription	Old Forest Multistrata	Old Forest Single stratum	Total acres
Commercial Thinning	162	44	206
Improvement Cut	53	15	68
Group Selection (Gross Acres)	26	0	26
Totals	**241**	**59**	**300**

Harvest activities are the same as Alternative B. The reduction of harvest activities also reduces the scope of connected actions.

Transportation System and Access Management

Transportation and access activities would be the same as for Alternative B except:

- Standard maintenance would occur on 30.2 miles of Forest Roads.
- There would be 2.6 miles of roadside brushing.
- There would be 1.5 miles of temporary road construction on Harvest unit # 66, #80, #47.
- Eight closed roads would be opened for a total of 6.4 miles. These roads would be closed again at the end of the project.

Specific Management Requirements Common to Action Alternatives

Fish ,Water Quality, and Soils

Protect PACFISH Riparian Habitat Conservation Areas See Appendix E. Harvest and associated landings would occur outside of RHCAs. Forwarding would be conducted away from RHCAs. If a crossing of a Class 4 stream is needed, the forwarding would occur over logs positioned to minimize soil disturbance in the draw bottom. Such crossings would occur during dry soil conditions. If trees within RHCAs need to be cut for safety reasons, they would be left as downed wood.

Forwarder trails crossing the draw bottoms would be at approved locations.

Retain downed wood in ephemeral draws, as detailed in Appendix E.

Meet Best Management Practices as detailed in Appendix E.

Use existing trail system as much as possible. Ground-based equipment would operate when the soil conditions are well drained.

Minimize exposure of soils. Stabilize landing approaches with slash, bark, or native seed.

Wildlife

Restrict activities in elk calving areas until after August 20 in units 64, 65, 66, 67, 72, 73, 74, 75, and 78.

Protect goshawk nests from disturbance if any are located during project activities (No nest sites are currently identified). Defer harvest on 30 acres of the most suitable nesting habitat around nest sites. Retain late and old structure forest in a 400-acre post-fledging area (PFA) as determined by the district biologist. Defer activities in active PFAs from April through August.

Protect other known or discovered raptor nest sites from management activities and human disturbances until fledging has been completed. Levels of protection would vary by the requirements of the species involved.

If blown down trees occur in units, retain two piles per each 5 acres to provide denning opportunities for Canada lynx and other wildlife species.

Maintain snags and green replacement trees at or beyond levels identified in Table 2-21. Leaving additional snags is highly desirable. Snag retention would be achieved on a 40-acre basis with at least 10-15 percent of the snags represented on each 10 acres, if available. Retention trees would be distributed naturally, either individually or in small groups, in all plant association groups. Preferably, all snags retained would be greater than 18-inch diameter at breast height, but if there are not enough snags of this size within the 40-acre unit, all large snags would be left and some smaller snags would be retained to make up the difference. Tree species and soundness at the base would also be considered. The tree species most preferred are ponderosa pine and western larch. Other species (Douglas-fir, grand fir, and lodgepole pine) should be retained if they are substantially larger than the available pine, or if pine and larch are not available. In addition, where safety allows, hollow or partially hollow, broken top snags greater than 15 inches diameter at breast height would be left to provide roost habitat for bats. Dead grand fir most commonly provides hollow tree habitat.

Table 2-21. Minimum snag retention per acre by plant association group. Leaving additional snags is highly desirable.

Plant Association Group	Snags / Acre	Green Tree Snag Replacements / acre
Warm – Dry	2.3	15.8
Cool – Moist	1.8	9.4
Cold – Dry	1.8	14.4

Maintain large down wood throughout the stand as illustrated in Table 2-22.

Table 2-22. Minimum 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
Cool grand fir	15	12 inches	>6 feet	>100 feet
Lodgepole pine	15	8 inches	>8 feet	>120 feet

Sensitive Plants

Activities and activity areas have been planned to avoid effects to sensitive plants. If any changes are considered, mapped locations of Botrychium species (moonworts), Leptodactylon pungens ssp. hazeliae (prickly phlox), and Carex backii (Back's sedge) would be reviewed to ensure plants are protected.

Noxious Weeds

The Prevention Strategy listed in the Region 6 Vegetation Management FEIS and Mediated Agreement would be used to control noxious weeds. The following measures would be taken in addition to those listed in the Umatilla National Forest Noxious Weed EA, and are a summary of those proposed in the Noxious Weed Report. The Report is the site specific plan that would be implemented with these projects i.e. timber sales, prescribed fire, road obliteration, subsoiling, and applies to all actions implemented from this environmental analysis.

Clean equipment for logging, slash masticating, and road construction prior to moving onto the Forest. Approve the use of on-Forest cleaning sites in advance.

Keep skidding, felling, masticating, and road construction equipment clean of noxious weed seed when moving between units. This can be accomplished by various methods such as washing equipment prior to leaving a noxious weed site, moving equipment through a site prior to seed formation, taking alternate routes around infestations or removal of seed heads or plants prior to moving.

Avoid parking vehicles and equipment in noxious weed sites.

Map noxious weed sites to be controlled in the planning area. Provide the map to purchasers and contractors. An identification review of specific weed(s) may be necessary for the purchasers or contractors to comply with the implementation procedures.

Avoid exposing mineral soil adjacent to weed sites, to minimize their enlargement.

Maintain ground cover wherever possible to prevent infestations from developing or expanding.

Reseed areas where soil is displaced for landings, temporary roads, or road obliteration. Use certified weed-free, non-persistent seed, preferably native grass seed if available. Consider fertilizing as part of reseeding plans if a combination of seeding and fertilization would decrease the incidence of weeds.

Monitor proposed temporary roads, landings and other sites of ground disturbance or canopy reduction for new infestations of noxious weeds. Treat newly identified sites as soon as practicable after a site-specific analysis; time treatment to be most effective. Schedule several treatments, if necessary to control the infestation. After the final treatment, develop a site specific reseeding plan for fully occupying the site with desired grass, forb or shrub species. Consider fertilizing and burning as part of the reseeding plan if these measures would decrease the incidence of weeds.

Maintain a vigorous herbaceous cover along the edges of roads to reduce the risk of noxious weed infestations. Consider reseeding closed roads that are used for access.

Where practicable, maintain tree cover along roads. Shading reduces the incidence of new knapweed sites.

In areas of high noxious weed infestations, consider closing roads temporarily to reduce enlargement of sites. This would be done with public input if the planned treatments are not effective because of vehicle travel.

General Control of Harvest

Evaluate landings for subsoiling and schedule if needed. Subsoiling would reduce compaction and break up the bark left behind after log haul.

Schedule harvest activities so that conflicts with grazing do not occur.

Treat grand fir and subalpine fir stumps with borax to reduce the risk of root disease spreading to the remaining trees.

Protect cultural/historic sites by avoiding them. There are two cultural sites in harvest units included in the Modified Proposed Alternative, and one site adjacent to a road.

No harvest activities would be conducted within applicable PACFISH Riparian Habitat Conservation Areas (RHCAs) for any stream, with the one exception of skyline yarding corridors traversing the RHCA of an intermittent tributary of Jarboe Creek. Trees cut inside this RHCA would be left.

When mistletoe infested trees need to be removed, no tree over 28 inches will be removed. The mistletoe tree removal will not increase the size of the group selection.

Reforestation/Tree Planting

No fertilizers or herbicides will be used in tree planting or other post-harvest reforestation.

Prescribed fire

The following items are in addition to those listed in "Specific Management Requirements.

Protect regeneration in Units 51, 69, 72, 73, 75 A&B, and 78. The regeneration has desired species composition. Before underburning these units, evaluate for jackpot burning so large clumps of regeneration are retained.

In the unlikely event of prescribed fire exposing sufficient bare soil near to stream channels causing measurable amounts of sediment to reach fish habitat, implement erosion control or sediment detention measures (i.e. straw wattles or straw mulch.)

Ignitions are permitted to the outer edges of RHCAs; see Appendix A for RHCA widths. Prescribed fire would be allowed to back into RHCAs.

Mop-up/suppression activities would be conducted for fires that cause mortality of trees at unacceptable levels. Within RHCAs, suppression activities would be triggered when 5 percent or less of the area is approaching 10 percent mortality of the canopy cover.

Construct blackline needed for control of prescribed fires no closer than the outer edge of RHCAs. No initial blackline or hand firelines needed for controlling the prescibed fire will be constructed in the RHCAs.

Retain as much duff as possible, while meeting fuel reduction objectives. Duff coverage helps control erosion and provides organic matter.

Do not use machines to build firelines.

Use a landing near burn units for fueling and servicing helicopters used in prescribed burns. Store fuel for the helicopter off site; deliver fuel via truck the day of the burn. Locate landings at existing rock sources or other disturbed areas.

Locate helispots in disturbed areas outside of RHCAs

Drafting of Water: See description under "Road Maintenance."

Wetting agents including detergents, soaps, and surfactants may be mixed with water for suppression activities, but will not be mixed or used near surface water and will be applied by hand for maximum control. Containers will not be filled or cleaned in streams.

With jackpot or underburning, limit soil exposure to 20 percent or less of the area.

With jackpot or underburning, time ignitions to reduce the risk of mortality to large trees.

Road Maintenance and Reconstruction

Protect one cultural site that is close to a road. Do not shift road alignment or drain water onto this site. Keep equipment from entering or parking on the site.

Use the State of Oregon in-stream work window to replace culverts in stream channels with perennial flows. Exact dates may vary by stream and by fish use.

Maintain mid-slope roads crossing RHCAs using methods that reduce sediment into stream channels. Use surface hardening, by water or rocking, when crossing RHCAs. Drain the road surface prior to entering RHCAs when drainage water can be spread overland and filtered prior to reaching channels. Dips would reduce the length of ditch entering channels within RHCAs.

Where possible, use small enough rock in surfacing roads to make mountain biking use pleasant.

Survey rock sources for noxious weeds. If weeds are found, use other sites unless the seed sources can be isolated and not contaminate loads.

Magnesium Chloride (MgCl) would be applied outside of PACFISH RHCA's when needed for dust abatement.

Specific protective measures for Water Drafting are as follows:

- Any intake used for drafting water will be screened for resident fish – no anadromous fish are present in the water drafting locations.
- During drafting, sources will be monitored for reduced flows. When and if low flow conditions are identified, the three spring-fed ponds will be used as sources prior to the use of stream sources whenever feasible. When not feasible and flow is reduced, pumping rates from streams will ensure that flow reduction is not more than 1/10th of the existing stream flow and will discontinue drafting if this amount is exceeded.

Blading, shaping, aggregate placement, and dust control should be performed in spring and early summer when flows are high to take advantage of available road soil moisture content to minimize the need for water drafting. Exceptions during the low-flow period would be limited to roads receiving heavy summer through fall traffic creating hazardous road surface conditions that require maintenance for human safety reasons. Essential maintenance during low-flow conditions would be deferred, when possible, until fall precipitation reduces the need for water drafting. Spring and fall blading and shaping would minimize demands for water usage, would minimize dust production, and would reduce sediment generated from surface erosion.

Specific protective measures for road surface shaping, blading, and rocking are as follows:

- Side casting of materials would not occur where those materials could be directly or indirectly introduced into a stream, or where the placement of these materials would contribute to the destabilization of the slope.
- Maintenance within RHCAs would be done in the drier season, except for snowplowing.
- Undercutting of cut slopes would be avoided during maintenance activities.
- Waste materials removed during maintenance activities, including ditch and culvert cleaning, will be deposited in approved disposal areas outside of RHCAs.
- Grader operators would backblade away from areas adjacent to streams where there is a potential for sediment delivery into streams.
- Sediment control devices would be placed to trap sediment in specific areas where sediment could reach a stream.
- Grassy areas would be maintained around ditch relief culverts to minimize the potential for sediment delivery to streams from road grading.
- Sloughing material would be deposited in a disposal site away from any stream and left to vegetate naturally. If the annual amount of slough is substantial and the road has narrowed through loss of material from cut banks or by machine removal of the slough, the slough material would be hauled to an approved, stable waste site and then seeded.
- Hazard trees felled in RHCAs would be left onsite.
- Conduct road maintenance and reconstruction with the necessary erosion control in place to prevent sedimentation into surface waters.
- Place a sediment barrier between Sheep Creek and the new overflow culvert installation on FR 6231.
- None of the proposed temporary road construction will cross stream channels.
- Temporarily constructed roads would be decommissioned, blocked, and revegetated with native seed upon project completion for each individual harvest unit.
- Brushing in drainage ditches ensures that water is not diverted out of the ditch. Brushing in drainage ditches can include complete removal of vegetation in the roadways as well as removing limbs from vegetation that may extend into the road. Debris from brushing operations would be scattered or chipped in areas where it would provide sediment control and/or other ecological benefits.

Specific protective measures for roadside brushing are as follows:

- In road segments that parallel stream courses, brushing operations would maintain stream shade along with safety considerations. This may necessitate hand brushing, partial brushing or limbing, with consideration for providing growth for future shade.
- Brush removal would occur within RHCAs only where safety is an issue. Options other than complete "removal" would be considered in order to leave ground cover to help control water and sediment flow off the road surface into the RHCA and stream channels.
- When brush cutting is necessary at stream crossings, it would be cut only to a minimum height of six inches above the ground to prevent sediment delivery to a live stream and would be left in ditches. Brush and other standing vegetation that provides shade and filtering of dust delivery to streams and would be maintained except where public safety is an issue.

- Roadside brushing that involves more than minimal removal of vegetation (*i.e.*, limbing of trees or removal of brush) in RHCAs would be reviewed by a Umatilla NF fish biologist.

Snow removal equipment would be of the size and type commonly used to remove snow, would not cause damage to the road, would be equipped with shoes or runners, and would leave a layer of snow one to two inches thick on the roadway. Snowplowing may occur inside RHCAs, but snow would not be sidecast directly into streams and sidecasting in areas adjacent to streams where there is the potential to cause snow or ice damming would be avoided.

When operating in RHCAs, all heavy equipment or other machinery would be inspected for hydraulic or other leaks. Leaking or faulty equipment would not be used. Equipment with accumulations of oil, grease, or other toxic material would be cleaned in pre-approved sites outside of RHCAs.

Monitoring

See Appendix E for monitoring related to water, soils, and PACFISH

Other Improvement Projects

The following projects have been identified as possible candidates to receive funding under the Knudsen-Vandenburg Act. These are commonly referred to as KV funds and are collected from the sale of timber. These projects would have their own decision documents and are not connected to the Lower Sheep Timber Sale and Fire Reintroduction Project.

KV funds might not be generated for all enhancement projects, therefore, other funding sources would be necessary or the unfunded projects would not be implemented.

KV projects requiring future decision documents. These are opportunities that may be pursued in the future and are not currently proposed under the action alternatives:

- Reforestation Restoration Project: The project would restore forest cover in old harvest units that were seeded with grasses that has limited the success of establishing a plantation.
- Replacement of culverts for fish passage.
- Placement of in stream woody debris.
- Planting of riparian vegetation in portions of Proctor Creek.

KV projects already having a decision document

Pruning old plantation adjacent to the Fry Creek Seed Orchards to create a shaded fuel break

Installing fencing around treated aspen stands and plant aspen.

Jarboe restoration burn and restoration in Jarboe and Brock Meadows.

Lower Sheep Hardwood project:

- Removal of conifers up to 18 inches to enhance hardwood growth,
- Fencing hardwoods,
- Maintaining existing fences around hardwood enclosures,
- Planting hardwoods,
- Planting hardwoods in riparian areas,

Comparison of Alternatives

This section describes the differences between alternatives with regard to the Purpose and Need and the Key Issues described in Chapter 1.

Table 2-23. Activities for each Alternative

Activities	Alternative				
	A	B	C	D	E
Harvest					
Total Harvest Volume (mbf)	0	9,853	6,244	5,948	5,748
Total Harvest (gross acres)	0	1,812	1,208	1,090	1,108
Total Harvest (net acres)	0	1,682	1,175	1,074	1,064
Commercial Thin – acres	0	1,420	1,006	861	834
Group Select – acres	0	169	47	28	60
Single Tree Select - acres	0	82	82	82	82
Improvement cut – acres	0	82	25	60	73
Shelterwood – acres	0	53	42	53	53
Seed Tree – acres	0	6	6	6	6
Skyline(S) or Helicopter(H) (# of units)	0	S 5	H 5	S 2	S 2
Fuel Treatments					
Total Fuel Treatments (acres)	0	4,616	4,012	3,894	3,912
Burning understory outside harvest units (acres)	0	2,763	2,763	2,763	2,763
Mechanical fuel treatment (acres)	0	1,283	917	833	908
Roads					
New System Road Construction (miles)	0	0	0	0	0
Maintenance (miles)	0	56.3	52.1	34.9	30.2
Temporary road construction (miles)	0	2	.7	1.1	1.5
Closed road opened temporarily (miles)	0	17.8	17.2	7	6.4
Shaping,blading & surface rock (miles)	0	7.7	7.7	7.7	7.7
Road brushing (miles)	0	3.4	2.6	2.6	2.6
Culverts replaced (number)	0	2	2	2	2
Culverts added (number)	0	2	2	2	2

Purpose and Need for Action

The following tables compares alternatives using measures and outputs that are used to indicate Purpose and Need attainment.

Table 2-24. Comparison of Purpose and Need by Alternative (Acres)

Purpose and Need	Alternative				
	A	B	C	D	E
Restores resiliency of vegetation[1]	0	4,231	3,755	3,623	3,613
Maintains western larch[2]	0	347	319	310	299
Maintains large tree size classes[3]	0	591	0	210	300
Improves Resistance to insect attacks and disease[4]	0	1,682	1,175	1,074	1,064

[1]Maintain and restore vegetation and forest character reflective of historic fire return intervals and other disturbance processes. Includes harvest and landscape prescribed fire and fuel treatments.

[2]Maintain western larch in stands currently dominated by that species.

[3]Maintain stands that have large tree size classes in a mix of early and late seral species in the overstory.

[4]Reduce stocking level to make stands more resistant to insect attacks and forest diseases, while maintaining the mixed species composition.

Table 2-25. Reduction of wildfire severity along private land boundaries

Indicator of Response	Alternative				
	A	B	C	D	E
Acres treated within half mile of private land.	0	1206	802	913	1025
% of harvest near private land [1]	0	67%	66%	84%	92%
Miles of private land boundary treated.	0	5.05	4.55	4.0	5.05

[1]Index is acres harvested near private land (row 1) over total harvest acres.

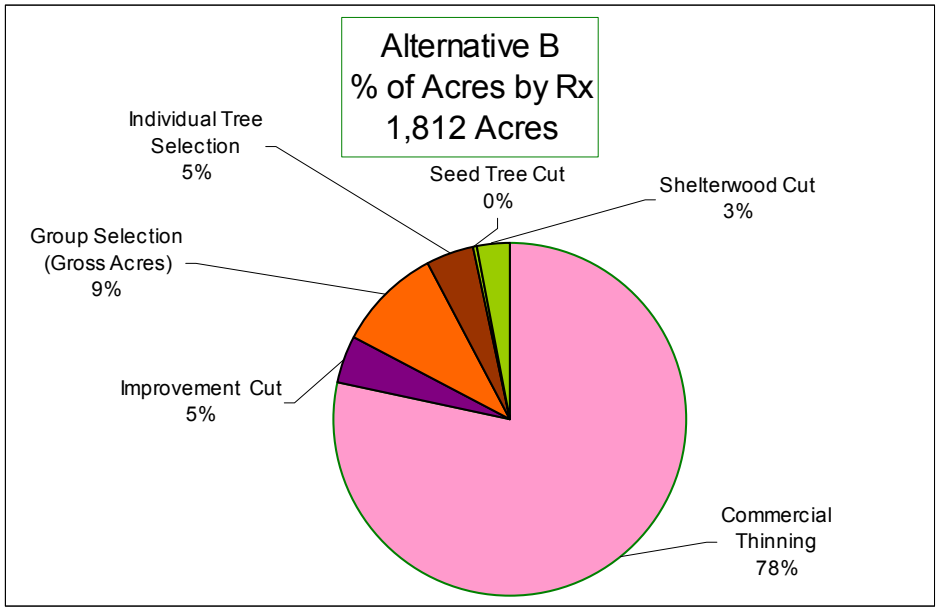
Table 2-25 shows that Alternative B does as much for the concern for private lands as Alternative E. Alternative E focuses more narrowly on this concern and excludes unrelated activities.

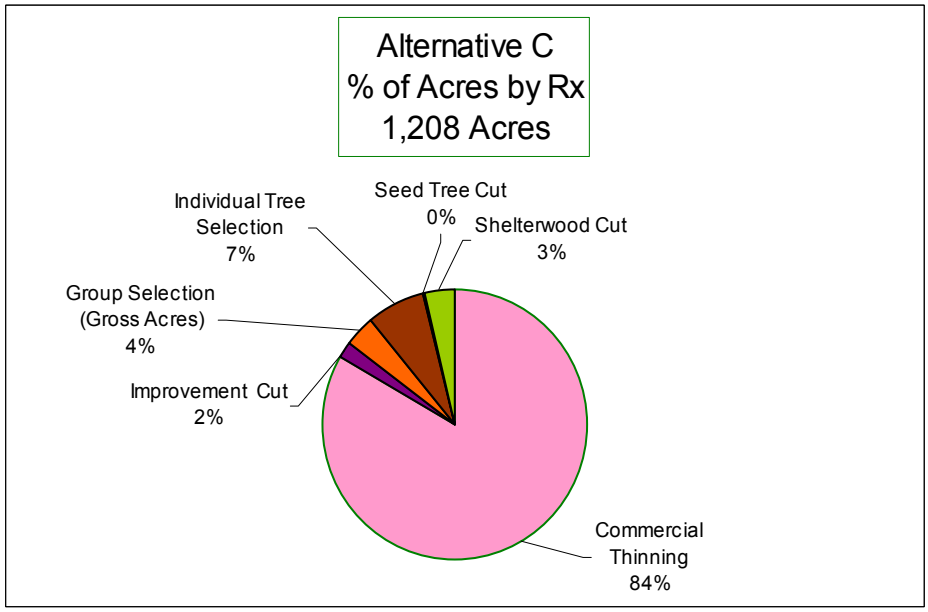
Table 2-26. Harvest comparison by Alternative

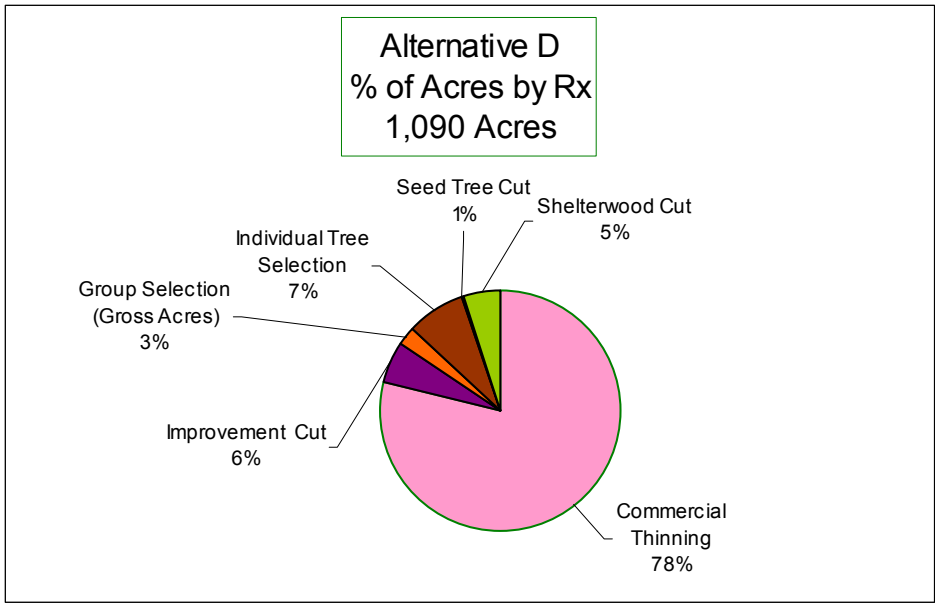
Attribute	Alternative				
	A	B	C	D	E
Harvest Volume (mbf)	0	9853	6244	5948	5748
Acres of harvest (gross)	0	1812	1208	1090	1108
Projected Volume per Acre (mmbf)	0	5.44	5.17	5.46	5.19

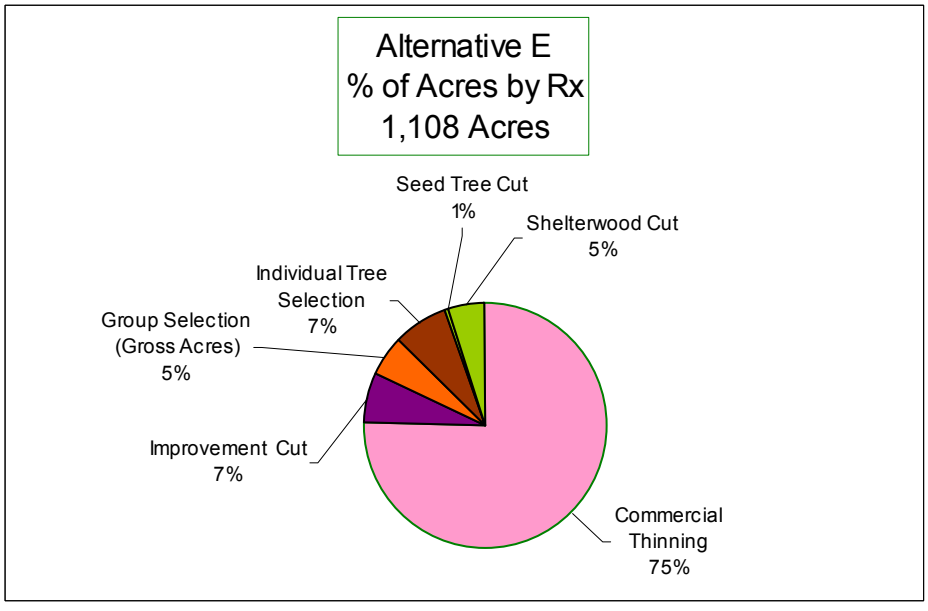
Table 2-26 displays harvest by alternative.

The following pie charts for each alternative shows that most of the proposed harvest is commercial thinning. In Alternative B, 78 percent of the proposed harvest is thinnings and 3 percent are regeneration cuts.









Key Issue 1 – Habitat for Canada lynx

The planning area is within the Timothy Lynx Analysis Unit (LAU). There is a conflict with timber harvest and jackpot burning or mastication of activity fuels that could change lynx foraging and denning into unsuitable habitat.

Indicators of response: acres of harvest activities within lynx habitat; percent unsuitable for lynx denning and/or foraging within the Timothy LAU; percent reduction in suitable habitat.

Table 2-27. Proposed Activities in Lynx Habitat and the resulting percentage of unsuitable Lynx Habitat in the Timothy LAU.

Lynx Habitat	ALT A	ALT B	ALT C	ALT D	ALT E
Acres affected	0	608	330	0	84
Resulting % Unsuitable for Denning and/or Foraging	24	26	25	24	24
% Reduction in Suitable	0	2	1	0	0

* = The numbers in Table 4-L1 of unsuitable and suitable habitat do not directly add up when compared to Tables 4-23 and 4-24 because not all harvest would result in a change to an unsuitable classification. Acre calculations showing the intermediate steps are available in the Wildlife Specialist Report.

Among alternatives considered, Alternative B increases the Unsuitable Habitat in the Timothy LAU the most. All alternatives are within the Forest Plan Standards and Guidelines.

Key Issue 2: Late/Old Structure and Connectivity

There is a conflict between retaining all large diameter trees, and maintaining forest health.

Indicators of response: Total old forest acres proposed Harvest; amounts of change in forest structure and composition.

Table 2-28. Acres of old forest structure treated by alternatives.

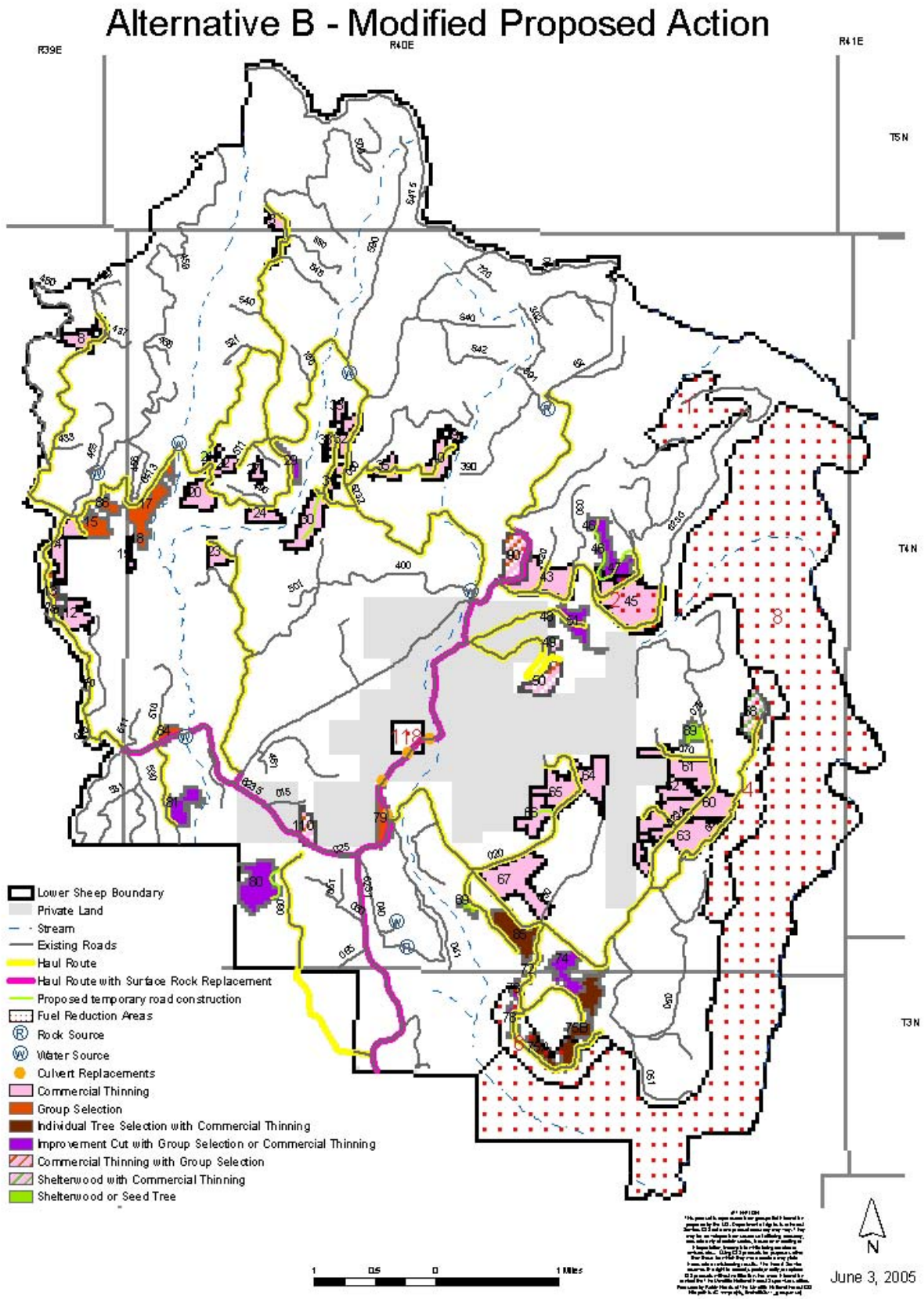
Old Forest Treated	Alternative				
	A	B	C	D	E
Multi strata	0	486	0	150	240
Single stratum	0	85	0	60	60
Total	**0**	**571**	**0**	**210**	**300**

Alternative B treats the most old forest structure. However, after treatment the stands would still meet the definition of Old Forest. Table 2-29 shows that there are no changes in structure in Old Forest Structure for any alternatives.

Table 2-29. Acres of Stand Structure Changes by Alternative

Old Forest Structure Changes	Alternative				
	A	B	C	D	E
Multi strata	0	0	0	0	0
Single stratum	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**

ALTERNATIVE MAPS FOLLOWING THIS PAGE


Alternative B - Modified Proposed Action
R39E
R40E
R41E
T5N
T4N
T3N
Lower Sheep Boundary
Private Land
Stream
Existing Roads
Haul Route
Haul Route with Surface Rock Replacement
Proposed temporary road construction
Fuel Reduction Areas
Rock Source
Water Source
Culvert Replacements
Commercial Thinning
Group Selection
Individual Tree Selection with Commercial Thinning
Improvement Cut with Group Selection or Commercial Thinning
Commercial Thinning with Group Selection
Shelterwood with Commercial Thinning
Shelterwood or Seed Tree
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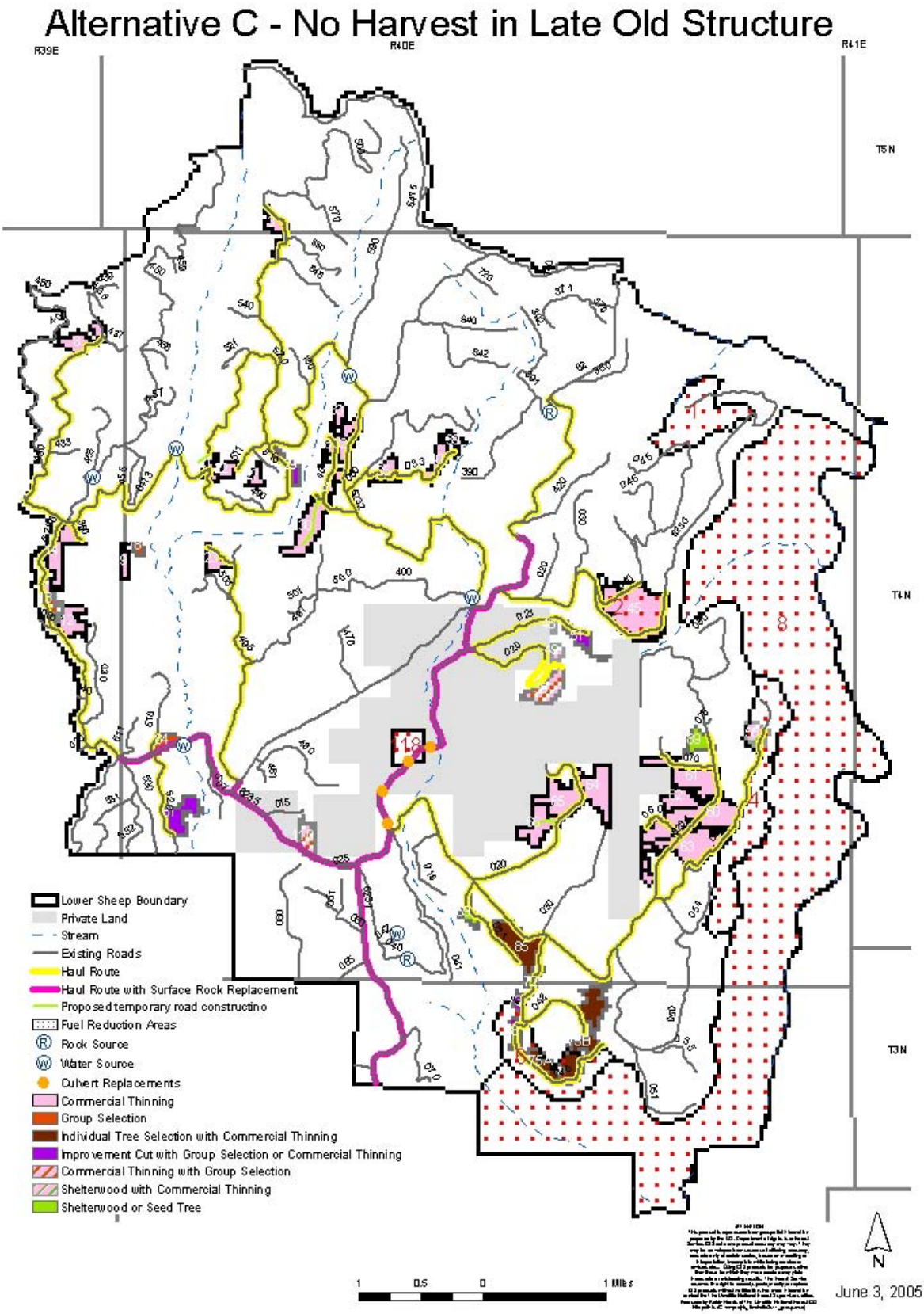
0
1 Miles
N
June 3, 2005


Alternative C - No Harvest in Late Old Structure
R39E
R40E
R41E
T5N
T4N
T3N
Lower Sheep Boundary
Private Land
Stream
Existing Roads
Haul Route
Haul Route with Surface Rock Replacement
Proposed temporary road constructino
Fuel Reduction Areas
Rock Source
Water Source
Culvert Replacements
Commercial Thinning
Group Selection
Individual Tree Selection with Commercial Thinning
Improvement Cut with Group Selection or Commercial Thinning
Commercial Thinning with Group Selection
Shelterwood with Commercial Thinning
Shelterwood or Seed Tree
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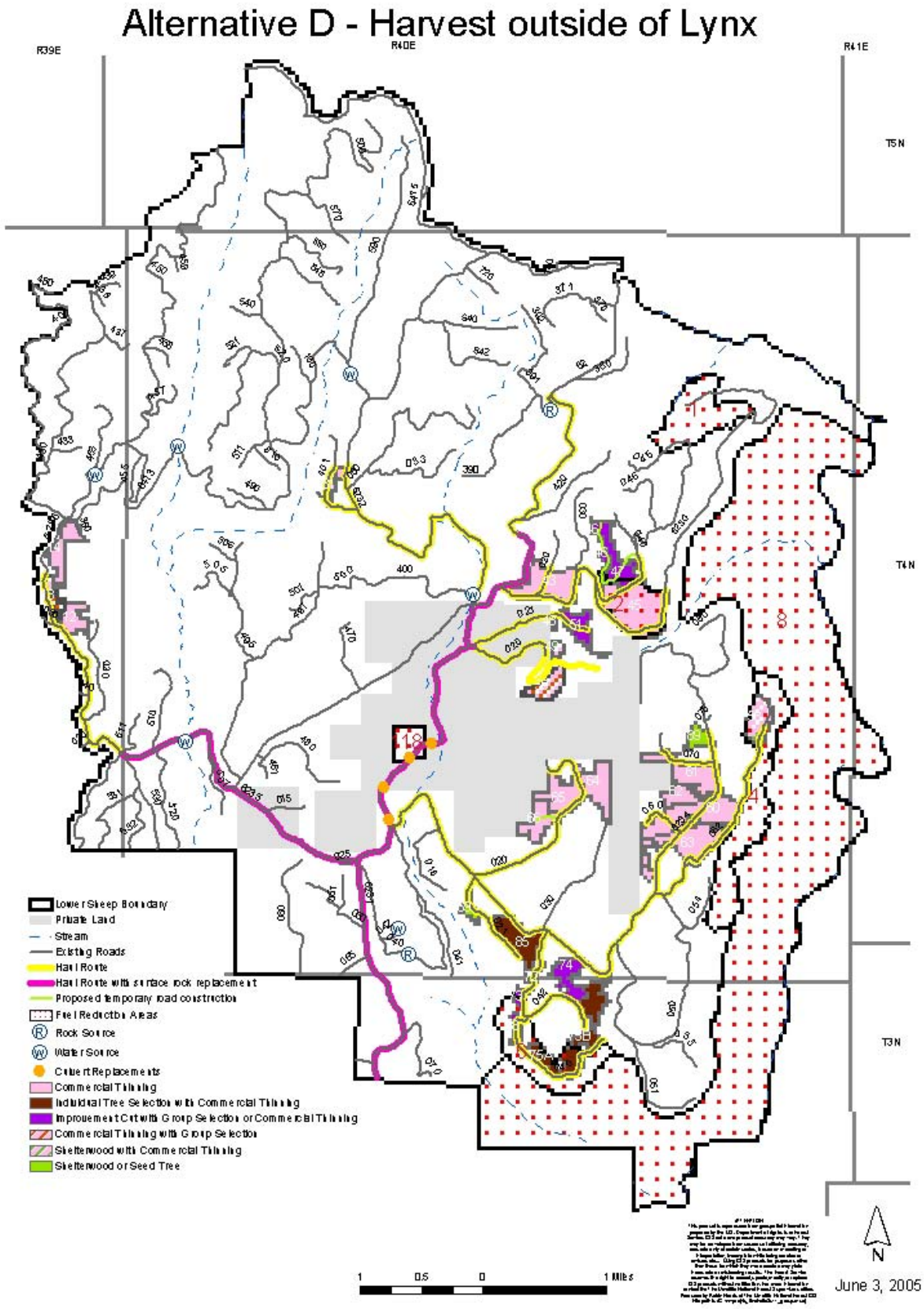
June 3, 2005


Alternative D - Harvest outside of Lynx
R39E
R40E
R41E
T5N
T4N
T3N
Lower Sheep Boundary
Private Land
Stream
Existing Roads
Haul Route
Haul Route with surface rock replacement
Proposed temporary road construction
Fuel Reduction Areas
Rock Source
Water Source
Culvert Replacements
Commercial Thinning
Individual Tree Selection with Commercial Thinning
Improvement Cut with Group Selection or Commercial Thinning
Commercial Thinning with Group Selection
Shelterwood with Commercial Thinning
Shelterwood or Seed Tree
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1 Miles
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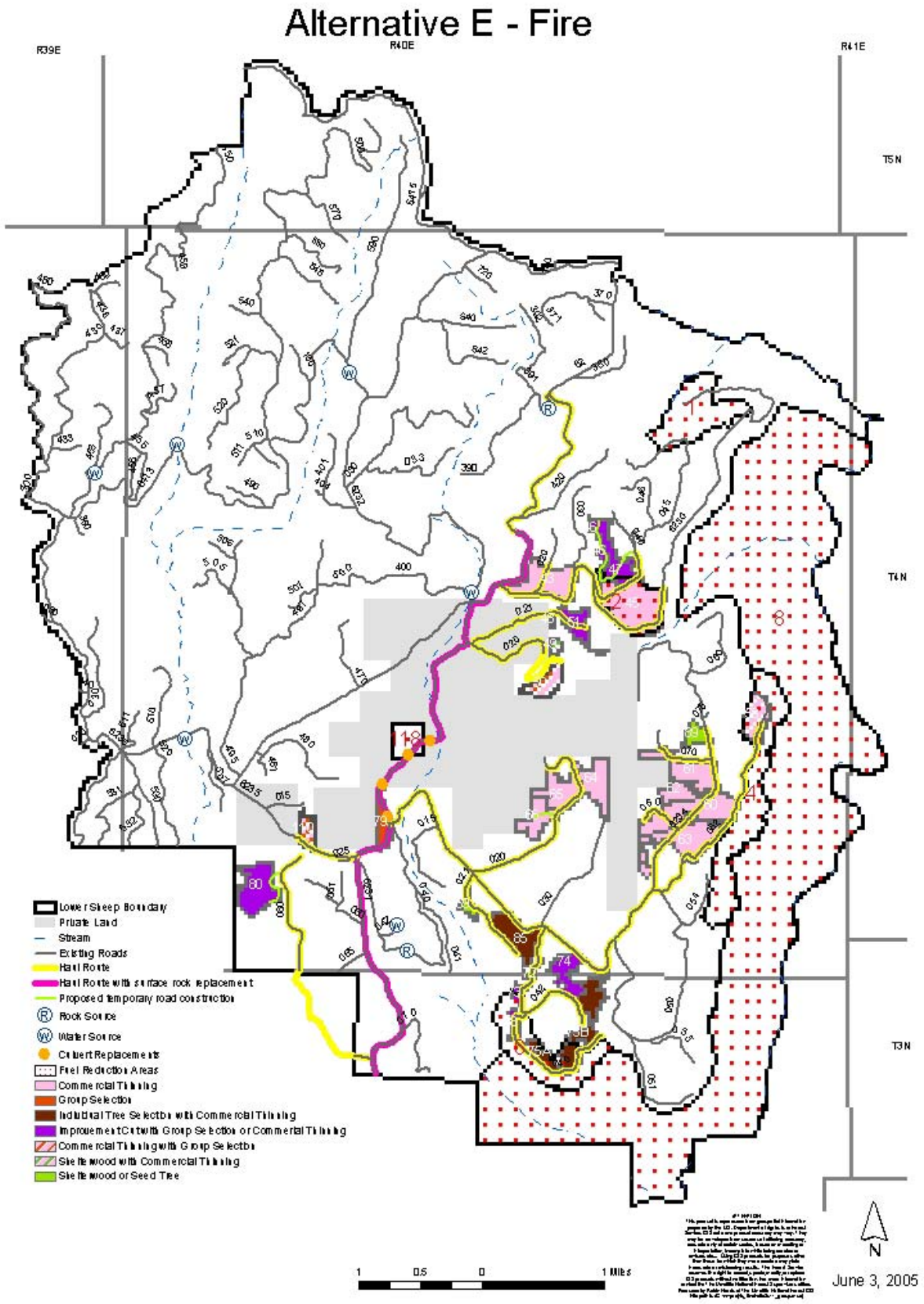
June 3, 2005


Alternative E - Fire
R39E
R40E
R41E
T5N
T4N
T3N
Lower Sheep Boundary
Private Land
Stream
Existing Roads
Haul Route
Haul Route with surface rock replacement
Proposed temporary road construction
Rock Source
Water Source
Culvert Replacements
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Individual Tree Selection with Commercial Thinning
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Commercial Thinning with Group Selection
Site Ie wood with Commercial Thinning
Site Ie wood or Seed Tree
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0.5
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1 Miles
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June 3, 2005

Chapter 3 – Affected Environment

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List of Tables and Figures

Chapter 3 - Affected Environment

Introduction

Chapter III describes the existing conditions for the resources that could be impacted by the alternatives: it does not display the effects of implementing the alternatives. Chapter III sets the baseline for the discussion of how the various alternatives would impact resources of concern displayed in Chapter 1.

The planning area is approximately 26,340 acres within the Upper Grande Ronde Watershed. The Forest Boundary and the Grande Ronde River form portions of the boundary. A portion of the Grande Ronde Scenic River and the Grande Ronde Roadless Area are along the east boundary of the planning area.

Major streams within the planning area: Alder Creek, Meadow Creek, Proctor Creek, Sheep Creek, Fry Creek, Jarboe Creek, and Brock Creek.

The legal locations: T. 5 N. R. 40 E. sections 31 to 33; T. 4 N. R. 39 E. sections 1, 12, 13, 24, and 25; T. 4 N. R. 40 E. all sections except for section 31; T4 N. R. 41 E. sections 7, 18, 19, 30, 31; and T. 3 N. R 40 E. sections 1 to 4, and 10 to 12: Willamette Meridian.

Past Actions

Past actions include timber harvest and prescribed fire along the canyon of the Grande Ronde River. There is no need to list the activities as there residual effect is displayed on the landscape and contribute to the description of the current condition. Past actions are maintained as a layer in the District's GIS database and they are used to calculate Equivalent Treatment Acres for watershed condition, HEI and cover values for big game, Historic Range of Variability, and soil conditions.

Present Actions, permits, contracts, projects, and uses include:

- Grazing – The entire Brock Cattle & Horse (C&H) Allotment and a portion of the North End Transitory Sheep & Goat (S&G) Allotment falls with in the Planning Area.
    - Brock C&H - This grazing allotment consists of two pastures; the Transitory Pasture which is 753 acres in size and the Pearson Pasture which is 632 acres in size (includes 345 acres of private land). The Annual Operating Plan sets the direction for grazing, the on and off dates and the amount of time in each pasture. The Transitory Pasture is stocked each year from June 10 through August 15 with 81 cow/calf pairs. These cattle are moved to the Pearson Pasture on August 16 and allowed to graze until October 15 at which time they are either moved onto adjacent private land or hauled out of the area by truck. Livestock water on the allotment is provided by either stock ponds or streams.
    - North End Transitory S&H – This grazing allotment is approximately 122,310 acres in size and comprised of six grazing units used by four bands of sheep each year from June 1 through October 9. A band of sheep consists of 1,000 ewes with lambs. With four bands of sheep and six units, two units are allowed to be either rested or deferred each year. This allotment has not been stocked since 2001 by the choice of the permittee. The Annual Operating Plan sets the direction for grazing, the on and off dates and the amount of time spent in each unit. The entire Planning Area is located in the Jarboe Unit. Transitory range (grazing created by timber harvest) provides most of the forage in this unit and the remainder of the allotment. Livestock water in this unit is provided by either stock ponds or streams.

- Fuelwood – The close proximity to Elgin causes the open roads to receive heavy firewood collection. Dead and down wood within 300 feet of the road is available for personal use.
- Recreational Road Use – Dispersed recreation is mainly hunting on open roads and roads that are opened in the fall during hunting seasons. There are two dispersed use campsites on Sheep Creek. Fry Meadows Guard Station is in the cabin rental program and receives year round use. Winter use includes groomed snowmobile trails. Forest Road 62 provides a link between Troy, OR, and the Middle Grande Ronde Valley around Elgin, and is one route used by rafters on the Grande Ronde River for vehicle shuttles.
- Noxious weed control – Currently, herbicide and manual methods are being used to reduce infestations along open and some closed roads per guidelines of the Forest Noxious Weed EA.
- The Fry Creek Seed Orchards are located in the planning area. They consist of a ponderosa pine orchard and a Douglas-fir orchard. Their purpose is to improve the growing stock for future reforestation projects. These orchards are not involved in any of the Lower Sheep proposed actions.
- Private lands: Most of the lands adjacent to the southern boundary are large parcels managed for timber resources. Private land in the center of the planning area is managed for timber resources and grazing. Timber is the emphasis in the western portion and grazing the emphasis in the eastern portion.

Foreseeable future Actions

- Land use on Private lands: Existing uses on private land are expected to continue. Currently most of the private lands are used for timber resources and grazing. Adjacent to the Forest Boundary are private forestlands that would continue to have periodic timber management activities. The county is making efforts to control noxious weeds on private lands. Treatment of noxious weeds on National Forest lands is important to the county's success on private lands.
- Improvement and Restoration Projects listed in Chapter II that could be funded by available KV funds.

Fire and Fuels

This section summarizes and supplements information in the *Lower Sheep Timber Sale and Fire Reintroduction Fuels Report* available for review in the project analysis file at the Walla Walla Ranger District.

Scale of the Analysis:

Existing fuel conditions and trends have been summarized for the Planning Area.

Description

Though the Planning Area is not within or adjacent to a Wildland Urban Interface, the Planning Area surrounds approximately 2,400 acres of private lands with many private structures used for hunting and recreation. There are additional private lands south of the planning area and adjacent to the Forest Boundary. There is also a CCC era cabin on National Forest System lands at Fry Meadows available under the Forest Service Rental Program. Protection of these lands and structures from a catastrophic wildfire coming out of the Grande Ronde canyon is a concern because fuel conditions are becoming more complex making successful ground suppression efforts difficult and expensive.

The USDA Forest Service Strategic Plan for FYs 2004 to 2008 contains the goal to reduce risk from catastrophic fire, which not only has a focus on reducing potential catastrophic wildland fire, but also to suppress wildland fires at a minimum cost considering firefighter and public safety, benefits, and values to be protected. The Cohesive Strategy of 2002 also provides a goal to restore and maintain ecosystems to increase the percentage of Fire Condition Class 1 lands. Fuel reduction is just one of the goals for the Planning Area. This project also has components of the Strategic Plan's goal 5 to improve watershed condition by restoring and maintaining native and desired nonnative plant and animal species diversity in terrestrial and aquatic ecosystems and to reduce the rate of species endangerment by contributing to species recovery. Forest health and diversity can be maintained through mechanical treatments that improve or maintain tree growth and vigor while reducing competition to seral tree species coupled with the appropriate use of prescribed fire or mechanical fuel treatments to reduce the fine and small fuels.

Most of the stands in condition class 1 (see later in this section) are transitioning to more complex forest structure, adding to the standing dead and down fuels component and increasing horizontal and vertical fuel continuity of small, shade tolerant, tree species causing the potential for a wildfire to reach into the canopy. The risk of a wildfire becoming an active crown fire is increasing. The change to complex fuel conditions can best be described using Fuel Models.

Table 3-1. Acres of Condition Class by Fire Regime on National Forest System Lands

Fire Regime	Condition Class 1	Condition Class 2	Condition Class 3	Total Acres
1 - Frequent Fire Regime	671	4520	327	5,518
3 - Mixed Fire Regime	12,069	2,910	2,130	17,109
5 - Infrequent Fire Regime	824	440	9	1,273
Total Acres	13,564	7,870	2,466	23,900

Fire behavior in the Planning Area is described using Fire Behavior Prediction System Fuel Models of Anderson, 1982 in the publication *Aids to Determining Fuel Models for Estimating Fire Behavior*. The Planning Area could be characterized into 6 of 13 models. Fuels characterized by Fuel Model 8 would have the best success rate for ground crews taking suppression actions, low rates of spread and low intensity. Flame length is used in the field to estimate fire intensity. Flame lengths above 4 feet indicate that a fire is moving into moderate intensity, a level that is beyond the capabilities and safety protocol for taking a suppression action by a ground crew alone. Increasing the amount of Fuel Model 8 on the landscape would aid the control of wildfires and provide best protection for the private lands.

Table 3-2. Fuel Models of the Planning Area

Fuel Model	Description	Percent of the Planning Area	Flame Length	Rate of Spread*
1	Short Grass	4	4 feet	54 chains per hour
2	Pine w/ Grass Understory	33	7 feet	42 chains per hour
5	Shrubs or Forest Regeneration	18	6.5 feet	28 chains per hour
8	Young Forest	26	1 foot	3 chains per hour
9	Closed Pine Forest	5	3 feet	11 chains per hour
10	Timber (litter and understory)	14	5.7 feet	10 chains per hour
Total		100		

*Rates of spread and flame length was derived from the Behave Model under typical August weather conditions. Rate of Spread is typically measured in chains per hour, with 20 chains per hour being a moderate to high spread rate. Intensity is measured by flame length, with flames <4 feet being low intensity, and flames >8 feet of high intensity. Moderate to high intensity fire typically results in torching and crowning in forested stands, with significant spotting.

Approximately 31 percent of the Planning Area has Fuel Models indicating low fire intensity, 22 percent of the Planning Area is characterized with moderate fire intensity and 47 percent with high fire intensity (see Figure 3-1). Many of the stands are currently transitioning into older successional stages and more complex stand composition. They are changing from a relatively simple fuel complex and stand structure to one of greater complexity which changes condition class and Fuel Model. Stands currently characterized as Fuel Model 8 are moving into Fuel Model 10; moving from low to high volatility. It is desirable to retain the current condition of low intensity fires with low rates of spread along the breaks of the Grande Ronde to ease fire suppression efforts around the private lands.

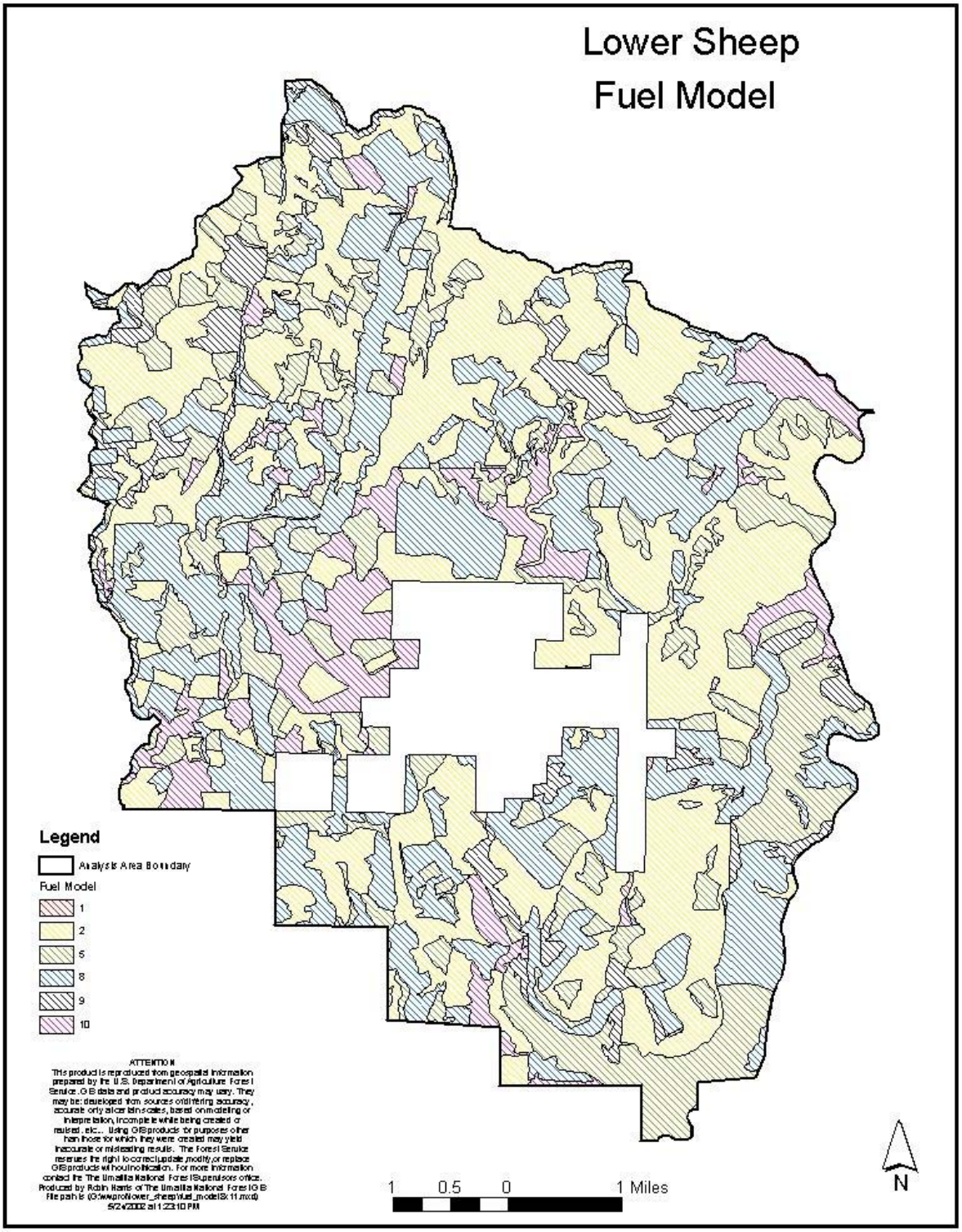


Figure 3-1. Lower Sheep Fuel Model

Fire Regimes and Condition class

Fire regimes have been classified at various scales, often encompassing specific mountain ranges or similar climatic zones. A fire regime for a particular land area is a function of the frequency of fire occurrence and fire severity. Some small areas are considered micro regimes due to the conditions of that specific site and may support fire more frequently than that of an entire geographic area or may not support fires due to localized weather patterns.

Table 3-3 displays fire regimes and their corresponding fire return frequencies and severity, not all are found in the Planning Area.

Table 3-3. Five Historic Natural Fire Regime Groups

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0–35 years	Low Severity
II	0–35 years	Stand Replacement Severity
III	35–100+ years	Mixed Severity
IV	35–100+ years	Stand Replacement Severity
V	>200 years	Stand Replacement Severity

The Lower Sheep Analysis Area occupies a transition zone between coexisting fire regimes (I, III, and V), sliding in scale from a frequent, low severity regime to one of somewhat less frequency and of moderate to high severity (Table 3-4).

Table 3-4. Fire regimes in the Lower Sheep planning area.

Regime	Percent of Planning Area	Location in Planning Area
Fire Regime I - Frequent Fire/Low Severity	20	Warm-dry forest type, almost all of it is found in the Grande Ronde Canyon and long the rim.
Fire Regime III – Mixed Severity	65	Found on the bench country from the rim to higher elevation slopes. Typical forest type is western larch. The interface of the frequent fire regime causes variable fire return intervals however fire reoccurs often enough to maintain western larch as a dominate tree species in the overstory.
Fire Regime V – Infrequent/High Severity	05	Grand fir dominated stands
Not Classified	10	

Condition Class (CC)

Condition classes are a function of the degree of departure from historical fire disturbance cycles caused by fire exclusion, timber harvesting, grazing, introduction and establishment of exotic plant species, insects and disease (introduced or native), or other past management activities. Missed fire return cycles results in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure (See Table 3-5). Condition class was originally developed as a description of the degree of departure of return intervals for the Frequent Fire Regime only. It is harder to interpret meaning to condition class in the mixed and infrequent regimes because high fuel loads would be an expected character with increased fire return intervals. Condition class 1 in the mixed and infrequent fire regimes can be quite high and create conditions that are not safe for firefighters making suppression efforts. In the mixed fire regime a change in the fire return interval also shifts conditions that are no longer favorable for maintaining early seral tree

species like western larch. The periodic fire disturbance in western larch helped to keep these stands open, reducing intertree competition to allow the trees to become large. Larch are very intolerant of crowding. Fuel Models provide a description of fire behavior and are used to model fire size and spread on a landscape.

Table 3-5. Condition Class Descriptions

Condition Class	Attributes	Example management options
1	• Fire regimes are within or near an historical range. • The risk of losing key ecosystem components is low. • Fire frequencies have departed from historical frequencies by no more than one return interval. • Vegetation attributes (species composition and structure) are intact and functioning within an historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
2	• Fire regimes have been moderately altered from their historical range. • The risk of losing key ecosystem components has increased to moderate. • Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. • Vegetation attributes have been moderately altered from their historical range.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
3	• Fire regimes have been significantly altered from their historical range. • The risk of losing key ecosystem components is high. • Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. • Vegetation attributes have been significantly altered from their historical range.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime.

Existing fuel and desired fuel conditions

Existing fuel loads in condition class 1 of the Mixed and Frequent Fire Regimes are very close to the desired conditions. Fuels in the 3 to 9 inch size class are high. Expected fire behavior would cause 5-foot flame lengths indicating a moderate severity fire with a rate of spread of 7 chains per hour. In general, fire suppression efforts would be successful, but the success of a ground crew containing a wildfire may require the assistance of air support to reduce the fire intensity and a need for a large crew.

Table 3-6. Existing Loading by Fuel Size Class

Fire Regime	0-1/4”	1/4 to 1”	1 to 3”	3 to 9”	9 to 20”	20”+	Total Tons per Acre	Photo Series GTR PNW-105
Mixed to Infrequent	1	3	5	16	5	1	30	1-MC-4; 2-MC-4
Mixed	1	2	3	12	2	1	21	2-MC-3
Frequent	1	2	2	5	1	1	12	Photo Series PMS-830, MC 02

Small size class fuels, less than 3 inches, weigh heavily in the ignition and spread of fire. Material greater than 3 inches diameter contribute little to fire ignition or spread but tends to slow crew production rates and increases fire intensity and residence time. The greater than 3-inch fuels contributes to long-term site productivity while the less than 3-inch fuels release nutrients more quickly through decomposition or burning. Desired fuel loading values were developed to control potential ignitions, the rate of spread, fire intensity, and residency time. The values were based on a Fire Behavior Prediction System Fuel Model 8 and Forest Plan direction in the Eastside Screen’s for large woody debris. The high tons in the 3 inch plus group are represented by large logs, greater than 12 inches small end diameter.

Table 3-7. Dry Forest Desired Residue Profile

Loading by Size Class: Tons per Acre					
0 to 1/4"	¼” to 1”	1” to 3”	3”+	Total	Photo Series PNW-105
1.5	1	2.5	6	11	7-PP-3 (0-3”) 1-LP-3 (3+)

Table 3-8. Moist Forest Desired Residue Profile

Loading by Size Class: Tons per Acre					
0-1/4”	¼” to 1”	1 to 3”	3”+	Total	Photo Series PNW-105
1.5	1	2.5	12	17	1-MC-3 (0-3”) 2-MC-3 (3”+)

Fuel Model 8 is generally characterized by slow-burning ground fires with low flame lengths, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only during severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short needled conifers support fire in the compact litter layer of mainly needles and occasional twigs.

Table 3-9. Lower Sheep Analysis Area Condition Class

Condition Class (CC)	%
1	51%
2	30%
3	9%
Private/Non-vegetated	10%
Project Area Total Acres	26,340

Fire History

Since 1970, there have been 946 wildfires recorded on the Walla Walla Ranger District. Lightning was the leading cause of the ignitions causing 67 percent of the starts. Within the Lower Sheep Planning Area, 55 fires have occurred since 1970 with an average size of 6.1 acres. The average fire return interval for the Planning Area is approximately every 16 years on any given 1,000 acres.

Air Quality

The Planning Area falls within a Class II airshed. The Wenaha-Tucannon Wilderness is to the west of the Planning Area. Prevailing winds are from the southwest with potential effects to northern Union County and Wallowa County. The town of Elgin, OR, is 14 miles south and Troy, OR, 19 miles to the northeast. The Environmental Protection Agency (EPA) monitors Carbon Monoxide, Nitrogen oxides, Ozone, Lead, Particulate (PM 10) and Sulfur Dioxide for Union County in La Grande. EPA gives portions of Union County a pollutant standards index of moderate because the yearly mean falls within the middle third of the PM 10 standard of 50 ug/cubic meter. EPA records since 1994 shows seasonal peaks in the pollutant standard index daily values for PM 10. None of the days exceeded the daily standard of 150 ug/cubic meter. These peaks occur in mid to late winter and late summer and early fall. The winter peaks are associated with wood heating and the late summer with wildfires. Fall peaks are a mixture of prescribed fire and wood heating. In the winter months, when temperature inversions become established in the La Grande Valley, smoke from wood heating is held in the valley. There are more peaks for extended periods of time during the winter than any other time of the year. Over the past 5 years, the number of days peaking above moderate levels has declined. There are days when visibility is reduced from field burning, wildfires, and slash burns. These levels do not appear to cause unacceptable air quality problems even during high fire years. Air Quality is relatively high in the planning area. The area potentially impacted by smoke has low populations and no large communities. The town of Troy would likely have similar conditions to that described for La Grande; however, due to lower populations would not have the degree of winter air pollution from wood heat.

Soils

This section incorporates by reference the *Lower Sheep Timber Sale and Fire Reintroduction Soil Report* contained in the project analysis file at the Walla Walla Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report.

Scale of the Analysis

The Lower Sheep analysis area is situated in the north-central part of the Blue Mountains ecological region. It is dominantly within the Columbia River Basalts Plateau-Lacustrine Influence subsection (M332Gm), and a small part on the eastern edge within the Snake River Canyon subsection (M332Gd) (as modified by Blue Mountain Forests staff) characterized by layered basalt flows with differential layers between those flows of lacustrine (water-lain) fines and old soils and weathered, fractured rock.

The area is dominated by long, steep canyons separated by relatively level plateaus, with the Grande Ronde Canyon on the eastern edge a dominant feature. The entire area has received both loess and volcanic ash air-borne deposits, both of which have been reworked in most areas. The deeper ash and loess soils are in the footslope and drainageways with substantial amounts remaining on the more stable upland plateaus.

Land Type Associations were developed for the Blue Mountain National Forests including this area. The Land Type Associations (LTAs) are shown in Table 3-10.

Table 3-10. Land Type Associations (LTAs)

Code:	Descriptive Name:	Percent of Area
218:	Basic Igneous-Canyons-Dry Forest.	13%
118:	Basic Igneous-Canyons-Moist Forest	4%
116:	Basic Igneous-Gentle Slopes- Moist Forest	50%
146:	Lacustrine Interlay-Gentle Slopes- Moist Forest	7%
117:	Basic Igneous- Steep Slopes-Moist Forest	9%
144:	Lacustrine Interlay- Landslide- Moist Forest	16%
516:	Basic Igneous- Gentle Slopes- Rock/Non-Vegetated	<1%

Key items for attention in this area:

- Stability – the basalt formations in this area are generally quite stable, however, the lacustrine interbeds are unstable with major disturbances (such as when intersected with road cuts) and are associated with long-term, geologic-scale land movements typified by the Sinks area adjacent to this area. Vegetative treatments have not proven to induce any mass movement or landslides. The steep headwall areas along the Grande Ronde River canyon are also prone to stability problems with road fill (e.g. Road 62 near Lookout Mountain).
- Springs – springs are common in the upper canyon sideslopes where interbeds (between the basalt rock flows) of buried soils and fractured rock layers accumulate subsurface water and allow lateral movement of that water to the surface. (Note these should be protected by PACFISH buffers.)

The Umatilla National Forest Soil Resource Inventory (SRI) provides soil inventory information and, in conjunction with field observations, forms the basis for area and site descriptions and existing condition assessments. Many of the mapping units are complex units of two or more soils or soil types. Soil taxonomic descriptions are not listed in this document, but may be found in the SRI.

Surface soil textures are primarily silt loam and gravelly silt loam with volcanic ash dominating on the deep, footslope positions and more stable uplands. The shallower soils on the level plateaus and steeper shoulder and upper sideslope areas developed in the basalt and andesite rock, but are mixed with volcanic ash. They have gravelly loam and silt loam textures with some areas of silty clay loam in the more developed residual soils.

Loess subsoils also occur in parts of the area in similar relocation pattern as the volcanic ash, usually at depth below the volcanic ash or mixed into surface horizons of residual soils formed in basalt and andesite. These wind-blown deposits have favorable water-holding capacity, though not quite as good as ash soils, and favorable nutrient content when weathered. These soil properties, in concert with the marine-influenced climate, provide for the good growing conditions in the deep to moderately deep soils plateaus and lower sideslopes and drainage ways.

To identify potential soil concern areas, the Soils Resource Inventory (SRI) mapping was consulted for the soil attributes of puddling[1], erosion, mass wasting[2], and compaction. The complete table with listings by Harvest unit can be found in the Lower Sheep Soils Report. Table 3-11 displays the percentage of units with a high potential for these attributes.

[1] Puddling is the tendency for fine textured soils to become impervious to water after being worked.

[2] Mass wasting is the tendency of a soil to move in mass. A landside is an example.

Table 3-11. Percent of Harvest units with a high potential for selected soil attributes.

Soil Attribute	Puddling	Erosion	Mass Wasting	Compaction
Percent of Units in Modified Proposed Action	56%	37%	12%	68%

Findings

Much of the planning area and all of the harvest units were visited and inspected for soil concerns following the Protocol for Assessment and Management of Soil Quality conditions. (See Appendix H for the protocol and Soils report for table showing stands inspected and site specific results.)

- Many of the potential treatment stands have had some prior entry related to harvest with some having several entries over many years. This is has been largely selection type harvests where individual trees or groups of trees were chosen and removed. Skid trail systems are still evident in many of the stands. These are largely well vegetated, stable and recovering surface duff layers and understory vegetation with no chronic erosion or other problems observed.
- All stands where activities would take place were found to be of low concern.
- None of the stands showed stability problems (mass-wasting) resulting from harvest activity, even though high vegetative disturbance levels had occurred in the past as evidenced by clear-cuts and likely broadcast burns.

Water Quality and Hydrologic Function

This section incorporates by reference the *Lower Sheep Timber Sale and Fire Reintroduction Report: Hydrologic Existing conditions and effects Report* contained in the project analysis file at the Walla Walla Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report.

Scale of the Analysis

The scale of analysis for hydrologic condition indicators, including road density, miles of road in Riparian Habitat Conservation Areas (RHCAs), and Equivalent Treatment Acres (ETA[3]) calculations is the HUC 6 (Hydrologic Unit Code[4]) Subwatershed. This is the scale at which these indicators are most useful. Generally, numeric information is available only for National Forest Service Lands and is reported as such. Site specific effects and treatment levels are reported and evaluated for the Planning Area, including acres of logging system, prescribed burning, road maintenance, and culvert replacement. Cumulative effect indicators like ETA are reported by HUC 6 SWS and cumulated by the HUC 5 Watershed. Analysis Area treatment effects are included in the cumulative effects indicators.

[3] Equivalent Treatment Acre (ETA) model is equivalent to the Equivalent Clearcut Acre (ECA) model and calculates percent disturbance with the same inputs and with the same formulas.

[4] Hydrologic Unit Code (HUC) is a national level, interagency map of the hydrologic system from regional scale drainage (e.g. Columbia Basin) to subwatershed level (40,000-100,000 acre) drainage.

Description of Subwatersheds

The Lower Sheep analysis area lies within the Upper and Lower Grande Ronde River subbasin. The Grande Ronde River is a tributary to the Snake River and their confluence is located 493 miles upstream from the mouth of the Columbia River. The analysis area is located primarily in National Forest Service (NFS) lands south of Forest Road (FR) 6415000, north and west of the Grande Ronde River, and east of FR 6236000. It is in the Lookingglass (HUC 1706010410) and Grande Ronde/Rondowa (HUC#1706010601) watersheds (Table 3-12).

Table 3-12. Acres and miles^2 by subwatershed for subwatersheds in the Lower Sheep Analysis Area.

Subwatershed (SWS)	SWS Name	SWS Acres	SWS Miles^2	NF Acres in SWS	NF Miles^2 in SWS	Acres in Analysis Area	Miles^2 in Analysis Area
170601041002	Little Lookingglass	23,772	37	20,520	32	1,936	3
170601041003	Jarboe	10,428	16	6,586	10	6,245	10
170601060101	Sheep Ck.	10,195	16	7,879	12	9,637	15
170601060102	Grande Ronde R./ Clear Ck.	19,055	30	7,844	12	6,246	10
170601060104	Grande Ronde R. /Bear Ck.	21,254	33	19336	30	2,251	4
Total		84,704	132	62,165	96	26,315	42

Stream flow

Streams in the Lower Sheep analysis area flow from the Blue Mountains in an easterly or southeasterly direction, to the Grande Ronde River. There are no published stream flow records for any of the streams in the analysis area; however, the flow is generally dominated by snowmelt with peaks in the spring and low flow in August and September. Many of the small streams that drain into the Grande Ronde River on the west side are intermittent or ephemeral. Sheep Creek, Meadow Creek, and Alder Creek are perennial tributaries and provide cooler water to the Grande Ronde River in the hot summer months (Table 3-13). Proctor Creek and Fry Meadow Creek are tributaries to Sheep Creek and are perennial or perennial interrupted and intermittent in the headwaters. Jarboe Creek and East Fork Jarboe Creek are perennial and many of their tributaries are perennial or intermittent. The headwaters of Brock Creek are perennial and the remainder of the creek is intermittent.

Table 3-13. Flow regime in the Lower Sheep analysis area.

SWS	Stream	Flow Regime	Approximate Rosgen[1] Stream Type by Reach Location		
			Upper	Middle	Lower
0101	Sheep Creek	perennial	E	C / B	A
0101	Fry Meadow Creek	perennial interrupted	B	C / B	A
0101	Proctor Creek	perennial	E	B	A
0102	Meadow Creek	perennial	E / B	B	A
0104	Alder Creek	perennial	A	A	A
1003	Jarboe Creek	perennial	B	E / G	B
1003	Brock Creek	perennial (HW), intermittent	B	E / C	B

1. Rosgen Stream Type is a system to classify streams based on channel morphology. It is used to compare and predict stream behavior; for example Type A streams are step/pool streams and would have similar geomorphic characteristics for gradient, entrenchment ratios, and sinuosity.

A chart of Level I streams is in Rosgen p. 4-4, figure 4-2.

Channel Network and Condition

The drainages in the Lower Sheep analysis area are representative of the northern Blue Mountains—moderately dissected, originating on wide uplifted plateaus dominated by fluvial erosion and shallow landslide activity in steep canyon headwalls. Contemporary landslide activity is largely confined to small (relatively) rockslides with occurrences mostly related to steep chutes in canyon headwalls and is a less pervasive erosional process than water and wind erosion. Generally, stream profiles in the analysis area begin with moderately steep first-order tributaries that flatten off on the plateau and run through many meadows, and then steeply drop off the Grande Ronde break. The approximate Rosgen stream classification (Rosgen 1996) for each stream by reach location is shown in Table 3-13. Channel condition in the steeper reaches is generally good, with sufficient bank vegetation and in channel woody debris. The ephemeral channels have vegetation and undisturbed duff within the channel.

Channel condition in the flatter gradient, middle reaches varies. Many of the meadow reaches (Rosgen E or C) show signs of bank erosion and down cutting. Riparian vegetation is often lacking and there are signs of cattle and wildlife grazing. Jarboe Creek is deeply incised as it passes through Jarboe/Brock meadow. The stream no longer floods the meadow and there is very little native riparian vegetation. Efforts began in 2002 to reduce invasive canary reed grass in riparian areas and to fence and plant native riparian vegetation in this area. The meadow reaches of Brock Creek and Meadow Creek are also slightly incised, choked in areas with canary reed grass, and lacking sufficient riparian vegetation. There are signs of bank trampling and browsing by both cattle and wildlife. Cattle trespass was identified as a problem early in the development of this restoration project and livestock management has improved. There are ongoing efforts to improve management of permitted and trespass cattle.

As the streams drop off the Grande Ronde breaks, the gradient greatly increases and vegetation is thick in the draws. Large woody debris is present and the channels are generally stable. The steep topography and harsh climate has protected these streams from the effects of extensive timber harvest and grazing. In fact, the entire Grande Ronde break on the west-side is within the roadless area.

Other indicators of watershed and stream conditions are current levels of timber harvest and roads. Considerable road obliteration and/or decommissioning work has occurred in the Lower Grande Ronde subbasin over the last few years. In addition, stabilization work on the remaining roads has been implemented to help reduce road-related sedimentation problems.

Road densities for subwatersheds associated with the Lower Sheep analysis area range from 1.7 to 3.5 mi/mi^2 (3-14). The Biological Opinion on the Umatilla National Forest Land and Resource Management Plan identifies road densities higher than 2.0 mi/mi^2 a risk to the aquatic system (NMFS 1995).

Table 3-14. Road density, RHCA road miles per stream mile, road-stream crossings on National Forest lands by subwatershed (SWS).

SWS	Subwatershed Name	NFS Rd. Density mi./sq.mi.[1]	Total RHCA road mi./stream mi. on NF lands
Upper Grande Ronde Watershed			
*170601041001**	*Upper Lookingglass*	*3.3*	*0.08*
170601041002	Little Lookingglass	3.0	0.15
170601041003	Jarboe Creek	3.4	0.11
*170601041004**	*Lower Lookingglass*	*2.4*	*0.05*
Lower Grande Ronde/Grande Ronde River Rondowa Watershed			
170601060101	Sheep Creek	3.1	0.22
170601060102	Grande Ronde. R./Clear Creek	1.7	0.09
*170601060103**	*Elbow Creek*	*3.8*	*0.16*
170601060104	Grande Ronde R./ Bear Creek	1.6	0.05
*170601060106**	*Grande Ronde R./ Slickfoot Creek*	*4.0***	*0.42*

** not in analysis area*

** NFS ownership is small, 4.2 mi sq.

1. Road densities pertaining to hydrologic systems are based on all system roads: opened and closed.

Road densities are greater than 2 mi/mi^2 in three of the subwatersheds in the Lower Sheep analysis area. Most of these roads are mid-slope or ridge-top and are not at a high risk for impacting stream condition. However, 10 road-stream crossings are increasing the risk of bank and bed erosion from undersized or damaged culverts and many are directly affecting fish habitat by limiting migration, and should be considered for replacement or repair (Table 3-15).

Table 3-15. Unstable culverts and / or culverts creating a fish passage barrier.

Culvert #	Stream	Road	Flow*	Problem
38 / 98	W. trib. Sheep	6232	Peren	debris at inlet and perched outlet; fish barrier
39 / 99	Sheep	6232	Peren	eroding inlet; fish barrier
41 / 102	Sheep	6231	Peren	perched outlet and shallow flow thru. culvert; fish barrier; needs overflow
43 / 101	Sheep	6200	Peren	fish barrier
66	Jarboe	6200	Peren	perched outlet; fish barrier; eroding banks from visitors
67	E. Jarboe	6413	Peren	inlet crush and filled with debris; perched outlet; fish barrier
68	Jarboe	6413	Peren	fish barrier
	trib. Sheep	6200	Peren	hole in culvert 2 ft. from outlet
	1st trib. E. Jarboe	6413	Ephem	inlet crushed
	3rd trib. E. Jarboe	6413	Ephem	inlet bent

* Peren = perennial, Int = intermittent, ephem = ephemeral.

In addition to replacing the culverts, four other areas should be considered for restoration:

- Jarboe Creek above the 62 road. The meadow reaches are deeply incised, void of riparian vegetation, and choked with canary reed grass. Restoration efforts began in the summer of 2002 and should be monitored and maintained.
- Meadow Creek near stand 6020544. The meadow reaches are starting to incise and banks are eroding from trampling by cattle and wildlife. There is no native riparian vegetation and canary reed grass is abundant. This area should be a high priority for restoration because it is still functioning and has potential to fully recover.
- Brock Creek above the 6413 road. This reach of Brock Creek is perennial and runs through a former clear-cut that is not fully revegetating. There is no riparian vegetation or large-woody debris in the stream.
- Brock Creek below the 6413 road and stand 6970048. This reach of Brock Creek is perennial and runs through a former clear-cut (acquired private land) that is not fully revegetating. There is no riparian vegetation or large-woody debris in the stream.

Water Quality

Substantial water temperature data has been collected in the Lower Sheep analysis area by the Umatilla National Forest (Table 3-16). Analysis of stream temperature data from Jarboe Creek showed that stream temperature has not significantly ($p = 0.444$) decreased since cattle were removed from the meadow in 1995. Also, analysis showed that East Fork Jarboe Creek does not significantly influence temperatures in mainstream Jarboe Creek (see Jarboe Creek Temperature Data report, 4/2/02, C. McCown and S. Peterson).

Table 3-16. Range and Average of Maximum Annual 7-Day Max. Average Stream Temperatures for period of record.

Stream	Years of data	Average of all years maximum 7-Day daily max. temp. and (range)
Little Lookingglass at FS	1992-2001	53 (52-54)
Jarboe Cr above 6413 road	1992-2001	57 (53 - 63)
Jarboe Cr above East Fork	1993-2001	60 (56 – 65)
Jarboe Cr below East Fork	1992-2001	61 (57 – 68)
Jarboe Cr above 6200 road	1993-2001	68 (65 – 74)
Jarboe at Forest Boundary	1997, 1999-2002	67 (65 – 70)
Sheep Creek	2002	66

Clean Water Act

Beneficial uses of the of the Grande Ronde Basin and the associated water quality parameters as defined by the State of Oregon are shown in Table 3-17. Parameters of interest for the proposed actions in the Lower Sheep analysis area are temperature, turbidity, sedimentation, and habitat modification.

Table 3-17. Beneficial uses and associated water quality parameters for Grande Ronde River Basin

Beneficial Use	Associated Water Quality Parameter
Public Domestic Water Supply	Turbidity, Chlorophyll a
Private Domestic Water Supply	Turbidity, Chlorophyll a
Industrial Water Supply	Turbidity, Chlorophyll a
Irrigation	None
Livestock Watering	None
Anadromous Fish Passage	Biological Criteria, Dissolved Oxygen, Flow Modification, Habitat Modification, pH, Sedimentation, Temperature, Total Dissolved Gas, Toxics, Turbidity
Salmonid Fish Rearing	Dissolved Oxygen, Flow Modification, Habitat Modification, Sedimentation, Temperature
Salmonid Fish Spawning	Same as Salmonid Fish Rearing
Resident Fish and Aquatic Life	Same as Anadromous Fish Passage
Wildlife and Hunting	None
Fishing	Aquatic Weeds or Algae, Chlorophyll a, Nutrients
Boating	None
Water Contact Recreation	Aquatic Weeds or Algae, Bacteria, Chlorophyll a, Nutrients, pH
Aesthetic Quality	Aquatic Weeds or Algae, Chlorophyll a, Nutrients, Turbidity

Oregon State water quality temperature criteria vary by beneficial use. No measurable surface water temperature increase (based on a 7-day moving average of daily maximum temperatures) resulting from anthropogenic activities is allowed where:

Table 3-18. Oregon State Water Temperature Standards Relating to Fish Use, March, 2004

Use	Max Temperature (Celsius)[1]	Max Temperature (Fahrenheit)[1]
Bull trout spawning and juvenile rearing	12	53.6
Salmon and steelhead spawning[2]	13	55.4
Cold water core habitat	16	60.8
Salmon and trout rearing and migration	18	64.4
Migration corridor[3]	20	68
Redband trout use	20	68

[1] Seven-day average maximum temperature.

[2]Applies to specific streams on specific dates. See maps.

[3]In addition, these water bodies must have coldwater refugia that's sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body.

The State of Oregon completed the Upper Grande Ronde River Sub-Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) in December 1999 which covers Subwatersheds 1002 and 1003 of the analysis area. The document established water quality goals for the streams of the Upper Grande Ronde Sub-Basin and laid out steps toward meeting them by establishing numeric goals for allowable levels of pollution (loads) by sub-basin within the larger basin (Oregon Department of Environmental Quality, 1999). The TMDL analysis assigned pollutant loads for water temperature and the WQMP established the means to meet the TMDL, and removes streams from impairment listing (303d).

In the Upper Grande Ronde Sub-Basin background stream temperatures exceed those required for fishes and no additional anthropogenic (human derived) inputs that can raise the water temperature are allowed.

Surrogate measures have been developed to guide improvement in water temperatures such as increasing percent effective shade, reducing channel width-to-depth ratios, and maintaining instream flows.

No TMDL for sediment was developed in the Upper Grande Ronde Sub-basin. The state determined that, "the load allocations provided to address temperature, pH, and dissolved oxygen standard violations, coupled with ongoing efforts by the U.S. Forest Service (USFS) to reduce loads from roads and other sources, will be adequate to address sedimentation and turbidity concerns in the Upper Grande Ronde Sub-Basin." To insure that sediment standards are met, long-term monitoring will be implemented.

The Forestry WQMP relies on current laws, management plans, and Best Management Practices (BMPs) to provide the basis for improving water quality in the forested landscape (Oregon Department of Environmental Quality, 1999). All federal land management activities must follow standards and guidelines (S&Gs) listed in the Umatilla National Forest Plan, as amended by PACFISH (USDA and USDI 1995), and BMPs as defined in the Implementation Plan for 208 (Water Pollution Control Act, PL 92-500, as amended). PACFISH provides management direction in the form of interim Riparian Habitat Conservation Areas (RHCAs) and S&Gs for Key Watersheds. All of the NFS lands in the Grande Ronde River Basin have been designated as Key Watersheds.

The WQMP expects current policies, regulations, BMPs, and adaptive management techniques to minimize unwanted sedimentation from forestry related activities. Habitat conditions are expected to be improved through implementation of BMPs developed for the temperature TMDL, which promote riparian conditions that improve channel stability and reduce erosion and promote the protection and recovery of channel morphology to the most stable forms.

Subwatersheds 0101, 0102, and 0104 will be covered in the Lower Grande Ronde River Sub-Basin TMDL and WQMP, which is in progress.

Riparian and Fish Habitat

This section summarizes and supplements information in the *Lower Sheep Timber Sale and Fire Reintroduction Project: Fisheries Specialists Report* contained in the project analysis file at the Walla Walla Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report. The report is available for a more detailed review upon request.

The Lower Sheep project area is almost entirely within the Grande Ronde River Drainage and all streams in the project area are directly or indirectly tributaries of the Grande Ronde River (Figure 3-2). The project area includes parts of both the Lookingglass (Hydrologic Unit Code 170601410) and Grande Ronde River/Rondowa (1706010601) watersheds. The watershed boundaries set the analysis area boundary for a broad scale discussion of impacts. The primarily focus would be on the subwatersheds (6^{th} field HUCs) that are at least partly within the project area boundary. These subwatersheds are: Grande Ronde River/Bear Creek (HUC 170601060104), Grande Ronde River/Clear Creek (170601060102), Sheep Creek (170601060101), Jarboe (170601041003), and Little Lookingglass (170601041002). Natural fish barrier water falls limits habitat for ESA listed fish species to the Grande Ronde River and the lower three quarters to a mile and quarter of the tributaries. There are no ESA listed species within the interior of the Planning Area. For a broader look at fish impacts the Lower Lookingglass (170601041004) and Upper Lookingglass (170601041001) subwatersheds are included in order to characterize habitat for ESA listed bull trout; he entire Lookingglass Creek watershed will be considered, not only Jarboe and Little Lookingglass subwatersheds. There are no activities proposed in the Lower or Upper Lookingglass subwatersheds with the Lower Sheep Project. These watersheds are strongholds for ESA listed bull trout, Snake River steelhead trout, and recently introduced Catherine Creek Chinook salmon.

Table 3-19. Streams in the Lower Sheep Project Area:

Project Area Streams	Barrier	Flow Regime	Other Comments
Streams in the Grande Ronde River/Rondowa Watershed			
Alder Creek	Yes	Perennial	Waterfall .7 mi. above mouth
Meadow Creek	Yes	Perennial	Barrier 1.25 mi. above mouth
Proctor Creek		Perennial	No fish, very steep gradient from Grande Ronde.
Sheep Creek	Yes	Perennial	Waterfall 1 mile above mouth
Fry Creek	Yes	Perennial	Sheep Creek Waterfall is a barrier.
Streams in the Lookingglass Watershed			
Jarboe Creek	Yes	Perennial,	Waterfall down stream from National Forest Boundary. Little suitable spawning area for Snake River steelhead
Brock Creek		Perennial, intermittent	Headwaters perennial, the rest is intermittent.
Little Lookingglass Creek	Fish weir	Perennial,	Not in project area but tributaries on east side of the creek arise within the project area: they are seasonally intermittent or ephemeral channels and do not host fish.

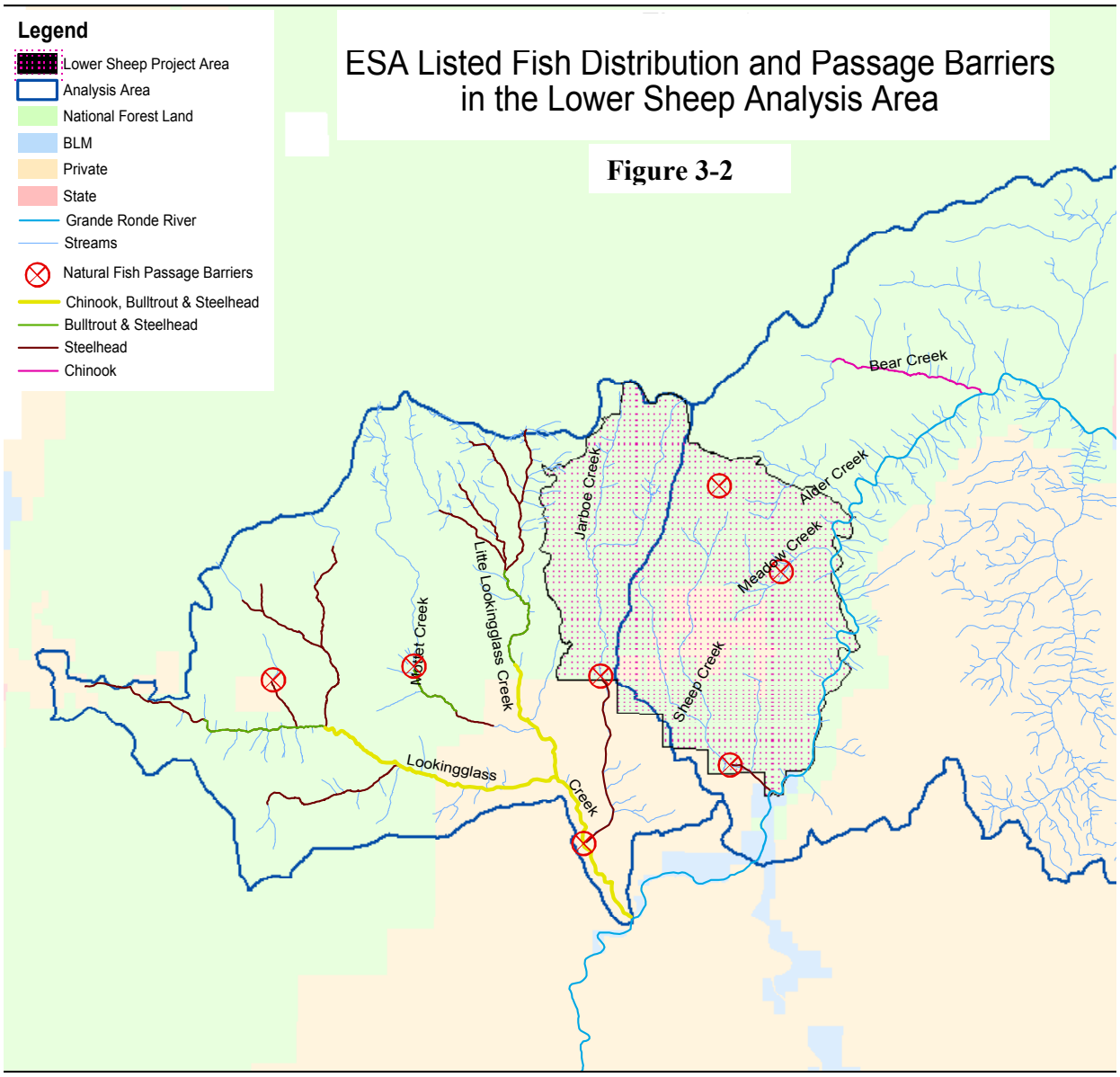


Figure 3-2. ESA listed fish distribution and passage barriers.

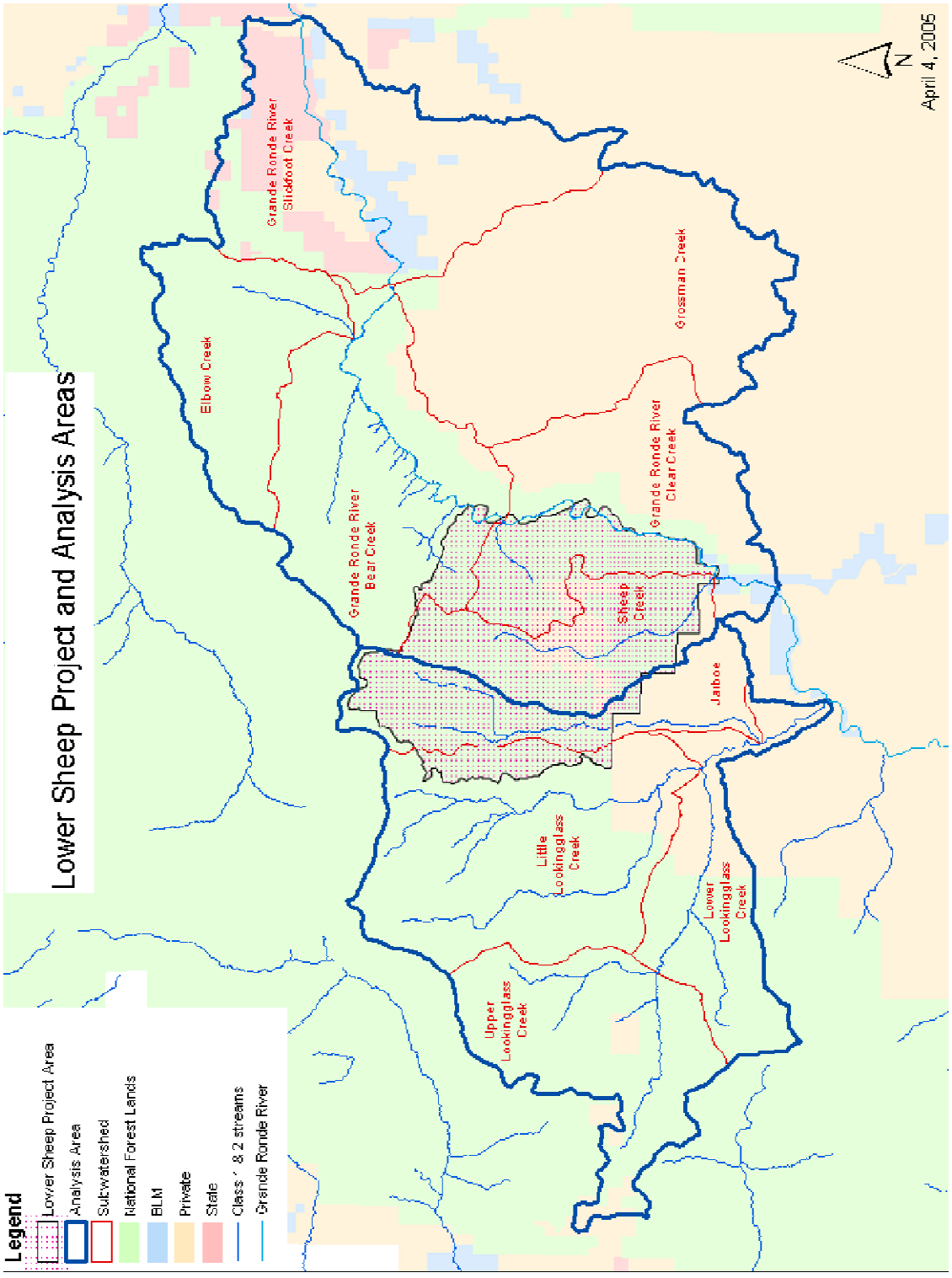


Figure 3-3 – Lower Sheep Project and Analysis Area

Aquatic Threatened, Endangered, Sensitive and Management Indicator Species and Distribution

Four stocks, including three species, of fish in the Grande Ronde Basin are listed as Threatened under the Endangered Species Act: Spring/summer and fall Chinook salmon *(Oncorhynchus tshawytscha)*, Snake River steelhead trout *(Oncorhynchus mykiss)*, and Columbia River bull trout (*Salvelinus confluentus)*. Figure 3-2 and Table 3-20 summarize the relationship of Threatened, Endangered and Sensitive (TES) aquatic species listed for the Umatilla National Forest to the Lower Sheep project area.

Table 3-20. Relationship of Listed Aquatic Species on the Umatilla National Forest to the Lower Sheep Project area

Stock	Classification	Grande Ronde Subbasin	
		Within project area	Outside of project area
Snake River steelhead	ESA Threatened	Yes	Yes
Mid-Columbia steelhead	ESA Threatened	No	No
Redband trout	R6 Sensitive	Yes	Yes
Snake River spring/summer Chinook salmon	ESA Threatened	Yes	Yes
Snake River fall chinook salmon	ESA Threatened	No	Yes
Middle Columbia spring chinook salmon	R6 Sensitive	No	No
Columbia River bull trout	ESA Threatened	No	Yes
Westslope cutthroat trout	R6 Sensitive	No	No
Margined sculpin	R6 Sensitive	No	No
Pacific lamprey	R6 Sensitive	No	No
Sockeye salmon		extirpated	extirpated
Coho Salmon		extirpated	extirpated

Snake River steelhead trout (anadromous *Onchorhynchus mykiss*). ESA Threatened, 1997; also a management indicator species: The steelhead trout spawning in the Grande Ronde subbasin enter the Grande Ronde River in two distinct migrations, one peaking in September and the other in March and April. Adults arriving in September hold in the Grande Ronde through the winter and spawn in tributaries from March through May with the peak spawning activity occurring throughout the subbasin in late April and May.

Steelhead that spawn in upper Lookingglass Creek and its tributaries must migrate past the Lookingglass fish hatchery, where ODFW controls access to upstream reaches with a weir. Steelhead are not believed to use Jarboe Creek because there is little or no suitable spawning habitat downstream of the barrier waterfall (Figure 3-2); however the main Lookingglass and Little Lookingglass Creeks have the greatest numbers of reds as indicated by recent spawning ground surveys. There is probably very little steelhead spawning in the Grande Ronde River adjacent to the project area but some of the tributaries (Sheep, Meadow, Alder and Bear Creeks, see Figure 3-2) may occasionally have a few redds ($\leq$3 per year).

Within the Planning Area, adult steelhead may be present in stream reaches below the falls anytime from September until June. Eggs remain in the gravel from one to two months, depending on water temperature, and fry emerge from May to June. Juvenile steelhead typically rear in their natal streams for up to 2 years. Depending on timing of emergence and spring runoff flows, fry may be washed some distance downstream and rear in habitat some miles from their origin. They typically begin their downstream migration to the ocean with high spring flows in March through May; juvenile steelhead would be present in the lower tributaries of the Grande Ronde year-round.

Sections of lower Sheep Creek between the Grande Ronde and the falls go completely dry in summer. Fry and juveniles rearing in sections that go dry must move either up or down stream to reaches with perennial surface water.

Redband trout (resident *Onchorhynchus mykiss*). R6 Sensitive; also a management indicator species: Inland redband trout are found in Jarboe Creek, Sheep Creek, Fry Meadow Creek, Lost Creek, and Mottet Creek above longstanding natural passage barriers. Redbands are same species as steelhead (*O. mykiss*) and juveniles cannot be distinguished phenotypicaly. Jubilee Lake has a history of being stocked with rainbow trout and it is speculated that Jarboe and Sheep Creek may have been stocked at some time in the past. Since there is no documentation about whether the streams in the Planning Area have been stocked, it is assumed that the redband in the Planning Area are resident fish.

Snake River spring/summer chinook salmon (*Oncorhynchus tshawytscha*). ESA Threatened, 1992: Spring/summer Chinook salmon migrate into Lookingglass Creek and other large Grande Ronde tributaries with the high flows of spring runoff. They seek cool water refuges where they hold until spawning in mid-August or early September. Because of the cooling influences of the Wallowa River (about 1.5 miles above the Planning Area) and Lookingglass Creek (about 4.5 miles above the Planning Area) Chinook may be able to hold in deep pools in some parts the Grande Ronde south of the Planning Area. Moving downstream, into the planning area, from the Wallowa confluence, the river becomes warmer and the less satisfactory for Chinook holding. Most of the Grande Ronde River immediately adjacent to the planning area is probably presently too warm in summer for Chinook holding or spawning.

Snake River spring/summer Chinook salmon historically spawned and reared in Lookingglass Creek and Little Lookingglass Creek. Because of the small size of Sheep, Meadow, Alder and Bear creeks, as well as the smaller Lookingglass tributaries, Chinook would not have used them for spawning, although they might have been used for rearing or as cool water refuge for juveniles spawned in the Grande Ronde River or main stem Lookingglass Creek. Depending on the size and timing of spring runoff flows and timing of fry emergence from the gravel, fish spawned farther upstream in the Grande Ronde River might be flushed downstream to these reaches. As water temperatures increased in the summer, these fish would seek the cooler water of these tributaries. Forest Service crews observed juvenile Chinook in Bear Creek during the 1996 aquatic habitat inventory; Sheep, Meadow and Alder Creeks would likely receive similar use.

Presently, ODFW controls fish access to Lookingglass Creek and its tributaries upstream of the Lookingglass Fish Hatchery with a weir at the hatchery. For most of the time that the hatchery has been in place, Chinook have not been allowed to pass the weir. Beginning in 1992, though, some spring Chinook have been allowed to pass the weir. Those fish were all of Rapid River stock and so would not have been considered as a listed species under ESA. The Confederated Tribes of the Umatilla Indian Reservation seeded Lookingglass Creek with excess returning captive broodstock progeny from Catherine Creek, which is also a tributary of the Grande Ronde River. These fish would be considered Threatened under ESA.

Snake River fall chinook salmon (*Oncorhynchus tshawytscha*) ESA Threatened, 1992: In the Grande Ronde River system, fall Chinook salmon spawn from the Grande Ronde's confluence with the Snake River upstream to the Wildcat Creek bridge, 17 miles downstream of the planning area. Numbers of fall Chinook salmon spawning in the Grande Ronde River have varied from a few to around 200 per year and there seems to be an upward trend, although trends in the Grande Ronde do not seem to be correlated to trends elsewhere in the Snake River system.

Columbia River Bull trout (*Salvelinus confluentus*) ESA Threatened, 1998: Both migratory and resident bull trout occupy the Grande Ronde subbasin. Migratory, and probably resident bull trout inhabit Lookingglass Creek and the Wenaha River downstream of the planning area. A few have also been observed in lower Bear Creek. Larger bull trout often migrate downstream during the cooler times of the year to forage in habitats such as the Grande Ronde River adjacent to the project area that would be too warm for them during the summer. As waters warm in the spring, these larger fish move back upstream, or perhaps downstream, returning to their natal habitats, i.e., Lookingglass Creek or the Wenaha River, to spawn.

Bull trout have among the lowest upper thermal limits and growth optima of North American salmonids (Selong et al, 2001). In other words, they require very cold water. Bull trout spawn from early September to late October. In the Lookingglass system, nearly all spawning takes place in mainstem Lookingglass Creek between the mouth of Eagle Creek and the Lookingglass springs downstream of the mouth of Lost Creek. Although small (< 10") bull trout have been observed in Lookingglass tributaries, they are uncommon there,

and redds are rare in those locations. Numbers of redds have been pretty stable over the period of record (1994 – 2004) at around 30 to 60 redds per year. The waters in the Planning Area are too warm for spawning or rearing habitat. Other than winter migration route in the Grande Ronde River, bull trout do not inhabit the Planning Area.

Essential fish habitat. Essential fish habitat applies only to habitat for commercially important fish species. For the Umatilla National Forest these are Chinook and coho salmon. Under authority of the Magnuson-Stevens Fishery Conservation and Management Act and Public Law 104-297, the Sustainable Fisheries Act of 1996, the Pacific Fishery Management Council has identified both the upper and lower Grande Ronde Hydrologic Units (HUCs 17060104 and 17060106) as Essential Fish Habitat (EFH) for both Chinook and Coho salmon. The Pacific Fishery Management Council defines EFH as "all currently viable waters and most of the habitat historically accessible to salmon within the USGS hydrologic units identified…" For Chinook, this would include Mainstem Lookingglass Creek at least as far upstream as the springs above the mouth of Summer Creek, Little Lookingglass Creek, perhaps as far as the confluence with Buzzard Creek, and the Grande Ronde River. The remainder of the project area streams either go dry or flow becomes so low that there is no effective holding water for spring Chinook to wait out the summer, and these streams would be inaccessible to fall Chinook.

Coho, on the other hand are winter spawners and many of the smaller streams (Sheep Creek, Meadow Creek, Alder Creek, some tributaries of the Lookingglass system) would have been flowing during their spawning times. So coho could conceivably have used these streams before they were extirpated from the Grande Ronde system.

Most named streams downstream of longstanding natural barriers in the analysis area are considered Essential Fish Habitat.

Columbia duskysnail (*Lyogyrus sp*.): The Regional Forester lists one sensitive invertebrate species as suspected present on the Umatilla National Forest. Known potential habitat for this species, the Columbia duskysnail, was surveyed in the summer of 2004 and no specimens were found.

Existing fisheries habitat condition

Temperature: With the exception of Jarboe Creek, little water temperature data is available for streams within the Project area. Lookingglass and Little Lookingglass Creeks are quite cool while the remaining streams in the analysis area are warmer. Water temperatures in Jarboe Creek, the warmest tributary stream in the analysis area, are above temperature limits for bull trout or anadromous salmonids, but it is not occupied by bull trout and is not accessible to anadromous salmonids. It is occupied by redband/rainbow trout and meets Oregon water temperature criteria for that species, so it is categorized as meeting Oregon State water quality standards.

Although the single season of Forest Service data for water temperatures of the Grande Ronde River near the downstream edge of the analysis area suggests unexpectedly low temperatures, the Grande Ronde River in the area south of the Lower Sheep Planning Area is in fact cooler than adjacent reaches upstream or downstream. This is due to the cooling affect of Lookingglass Creek and the Wallowa River. On August 20, 1999, the Grande Ronde just upstream of Lookingglass Creek was 79 F, and just downstream of the confluence it was just a little over 69, a difference of nearly 10 degrees. Lookingglass Creek is clearly a very important moderating influence on Grande Ronde River water temperatures and undoubtedly provides important thermal refuge habitat for fish holding or migrating in the Grande Ronde River.

With only a single season of water temperature records from Sheep Creek it would be premature to draw firm conclusions regarding the quality of the temperature component of fish habitat in this stream. However, an aquatic habitat inventory of that stream following R6 protocol, and several additional visits to that stream suggest that the stream is a) flashy, with high spring runoff, and then with long stretches going dry/subsurface in late summer and b) mostly pretty well shaded by vegetation and topography. These observations seem to support the single season's record of 66 F for a 7-day moving average maximum temperature. Until more data is available, it seems best to assume that the available data is representative, and that that stream is too warm

for anadromous fish habitat. This condition may be mostly or entirely a natural situation; this portion of stream and the Grande Ronde River are within the Grande Ronde Roadless Area.

Chemical contaminants and/or nutrients: We know of no source of chemical contamination for tributary streams on National Forest lands and, therefore, conclude that past and present Forest Service management activities do not increase levels of chemical contaminants in the Grande Ronde River. In fact, the tributary streams flowing from the National Forest would have a diluting effect to contaminant levels in the Grande Ronde.

Physical barriers (see Figure 3-2): The weir at the Lookingglass fish hatchery could restrict access to all tributary streams in the Lookingglass system (Figure 3-2). ODFW personnel working at the hatchery control access to habitat upstream of the weir.

A barrier waterfall in Jarboe Creek downstream of the National Forest Boundary prevents anadromous fish and fluvial bull trout from reaching that part of Jarboe Creek within the National Forest. However, resident redband trout occupy much of Jarboe Creek upstream of the waterfall. A pair of culverts at the 62 road crossing of Jarboe Creek was identified in the Forest culvert inventory as a fish passage barrier, but this would only affect resident redband trout.

Several high waterfalls on Sheep Creek prevent migratory fish in the Grande Ronde River from utilizing the upper reaches of that stream, although here too, resident redband trout occupy the reaches above the waterfalls. Some sections of lower Sheep Creek go dry, or flow subsurface, in summer, limiting movement of fish there. Several culverts 3 plus miles above the natural passage barriers were identified by the Forest culvert inventory as passage barriers to redband trout.

A series of cascades in Little Lookingglass Creek probably restricts migratory access to the upper reaches of that stream, but they may not be an absolute barrier, as at least one steelhead redd has been reported above the cascades. Small bull trout and resident redbands have also been observed above the Little Lookingglass cascades.

Twelve culverts in the Sheep Creek Drainage are probable fish passage barriers but because the above-mentioned natural passage barriers prevent migratory fish from reaching them, they do not restrict movement of ESA listed fish species. However, some of these culverts do restrict movement of USFS Region 6 sensitive redband trout.

Substrate, including embeddedness: The more recent surveys generally show what would be expected for these streams in a natural condition. The high values (i.e. Jarboe reaches two and three) are usually depositional reaches where higher proportions of fine sediment would be expected.

Large woody debris: Eleven of 26 streams in the analysis area for which useful data is available meet PACFISH standards. The remaining 15 streams would be low in woody debris but most have potential for future large woody debris recruitment. In some cases, the low woody debris frequency might be partially explained by the location of the stream in a meadow (parts of Jarboe Creek) and in other cases by past riparian timber harvest.

Pool frequency and quality: Most of the streams in the analysis area would be considered as meeting PACFISH standards for pool frequency and large pools.

Refugia: Areas of rufugia for bull trout and steelhead in the Lookingglass and Wenaha watersheds are in good condition because they are in Roadless or Wilderness areas. The Grande Ronde River provides poor quality connectivity between them because of high summer temperatures.

Riparian Habitat Conservation Areas: In the past, timber has been harvested from inside of RHCA's in all subwatersheds of the analysis area. Of course, RHCA's had not been designated at that time. Most of this harvest was over intermittent, non fish-bearing headwater streams. Timber has not been harvested inside of RHCA's since issuance of the PACFISH Decision Notice in 1995. Within the National Forest, most of the historically fish-bearing streams still provide good habitat for sensitive aquatic species. In order to evaluate the condition of RHCA's for purposes of Section 7 consultation, mapped harvest activities back as far as 1975 were overlain in GIS with PACFISH RHCA's to determine lengths of streams inside of harvest units. Over 80

percent of RHCA's in 5 of 9 subwatersheds are in natural conditions; the remaining four appear to have experienced harvest over more than 20 percent of the stream length in the National Forest portion of the subwatershed at some time within the last 30 years. For the earliest of these, the streamside vegetation would have at least partially recovered by now, and so conditions are certainly not as severe as the simple numbers would suggest. Practically none of this harvest was over stream reaches hosting ESA listed fish (see Table 3-21). Within the National Forest, RHCA's still provide good shade, large woody debris recruitment, and habitat protection for ESA listed fish.

Table 3-21. Miles of Stream Inside of Timber Harvest Units since 1975 in the Lower Sheep Analysis Area[1]

Subwatershed	Stream Class				Total NF miles riparian harvest	Total NF stream channel miles in watershed	NF stream miles with riparian harvest
	Anadromous Fish Bearing	Resi-dent Fish Bearing	Perennial non-fish-bearing	Inter-mittent[2]			
Upper Lookingglass	0.63		0.28	3.25	3.53	58.4	6%
Little Lookingglass	0.89	0.04	2.57	10.59	14.09	85.6	16.5%
Jarboe		1.26	0.34	4.50	6.1	27.1	22.5
Lower Lookingglass		0.07	1.00	4.52	5.59	35.4	15.8%
Sheep Creek		1.47	3.14	6.66	11.27	27.3	41.3%
GRR Clear Creek			1.70	3.60	5.3	34.2	15.5%
Elbow Creek			3.50	9.22	12.72	46.6	27.3%
GRR Bear Creek			2.45	5.87	8.32	86.2	9.7%
GRR Slickfoot Cr.			0.10	6.63	6.73	7.1	94.8%

[1]These numbers do not include activities on the east side of the Grande Ronde River or on non-National Forest land.

[2]Maps of many of the smaller perennial, non fish-bearing and intermittent stream channel locations were office-generated, and some have not been ground-verified. Numbers in these two columns are probably an over-estimate.

Ecosystems and Diversity

Three of the five historical natural fire regime groups occur in the Lower Sheep planning area (see Fuels discussion). Approximately 21 percent of the planning area is within the low severity frequent fire regime, 65 percent is in the mixed severity fire regime, and 5 percent is within the high severity infrequent fire regime.

Many of the stands in the planning area have departed from historical vegetation conditions and have become overstocked with shade tolerant climax species. Ponderosa pine is maintained by the frequent fire regime. Currently only 6 percent of the frequent fire regime area is dominated by ponderosa pine. Western larch is maintained by longer fire return intervals approaching 100 years. Currently only 4 percent is dominated by western larch.

In the Moist Upland Forest PVG, Old Forest Single Stratum structure currently makes up a larger percent of the planning area landscape than in the past. Old Forest Multi-strata structure is within the historical range. In the Dry Upland Forest PVG, Old Forest Multi-Strata structure currently makes up a larger percent of the landscape than in the past. Old Forest Single Stratum currently makes up a slightly smaller percent of the landscape than in the past. The relatively large amount of Old Forest structure in the planning area contrasts with the condition of many areas in the Interior Columbia River Basin, which according to ICBEMP are below historical levels of Old Forest. The action alternatives would not change the structural stages in the Old Forest.

Forest Cover Types: Forest cover types are based on a predominance of tree stocking, and are defined as the tree species that currently make up the largest part of a stand's canopy. The cover type is often different from the potential vegetation of the stand, unless there has been a long time since a major disturbance. Where one species does not make up the majority of the stocking, the stand is classified as a mixed stand and the species that makes up the plurality of the stand is specified (for example "Douglas-fir – Mix").

Table 3-22 below indicates that grand fir dominated stands are much more prevalent than any other cover type, making up close to half of all stands in the area. Historical information shows that much more of the area used to be dominated by western larch, and in the drier areas, ponderosa pine (Powell 2002). Information from ICBEMP indicates the same for much of the Columbia River Basin (Quigley et al 1996). Lack of fire and probably historical harvest methods have changed the species composition of the stands.

Table 3-22. Forest Cover Types on the Lower Sheep Planning Area

Primary Species	Abbreviation	Acres	% of Acres
Douglas-fir	DF	2,426	10
Douglas-fir - Mix	DF Mix	1,124	5
Engelmann Spruce	ES - SAF	1,270	5
Engelmann Spruce – Mix	ES Mix	184	1
Grand Fir	GF	10,484	44
Grand Fir - Mix	GF - Mix	786	3
Lodgepole Pine	LP	794	3
Lodgepole Pine - Mix	LP Mix	146	1
Ponderosa Pine	PP	808	3
Ponderosa Pine Mix	PP Mix	744	3
Subalpine Fir	SAF	1,027	4
Subalpine Fir Mix	SAF – Mix	169	1
Western Larch	WL	1,009	4
Western Larch – Mix	WL Mix	133	1

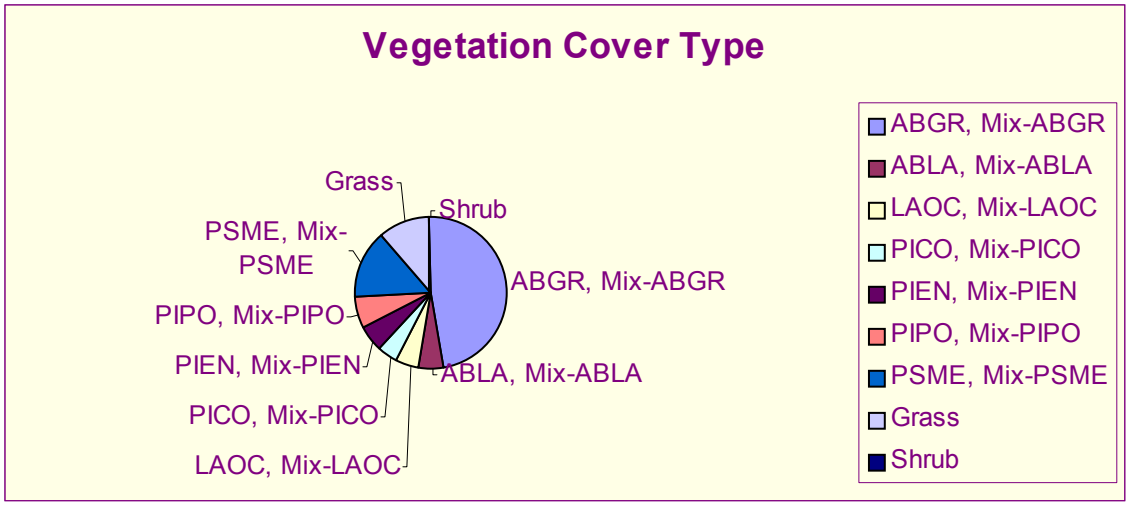


Figure 3-4. Forest Cover Types on the Lower Sheep Planning Area

See Table 3-22 above for explanation of tree species abbreviations

Forest Stand Structural Classes: The stand structural class synthesizes tree size, stocking level, and vertical arrangement in a forest stand. The table below summarizes the area of forest structural classes for the Lower Sheep planning area. (For a discussion of forest structural classes see Appendix K).

Table 3-23. Forest Structural Stages on the Lower Sheep Planning Area (National Forest acres only)

Lower Sheep Planning Area Forest Structural Stage	Abbreviations	Acres	% of Acres
Stand Initiation	SI	3,315	15
Stem Exclusion, Open Canopy	SEOC	6,364	30
Stem Exclusion, Closed Canopy	SECC	1,634	8
Understory Reinitiation	UR	377	2
Young Forest, Multistrata	YFMS	2,678	13
Old Forest, Multistrata	OFMS	3,020	14
Old Forest, Single Stratum	OFSS	3,715	18
Non-Forest (grass etc.)	NF	2,726	
TOTAL		23,829	100

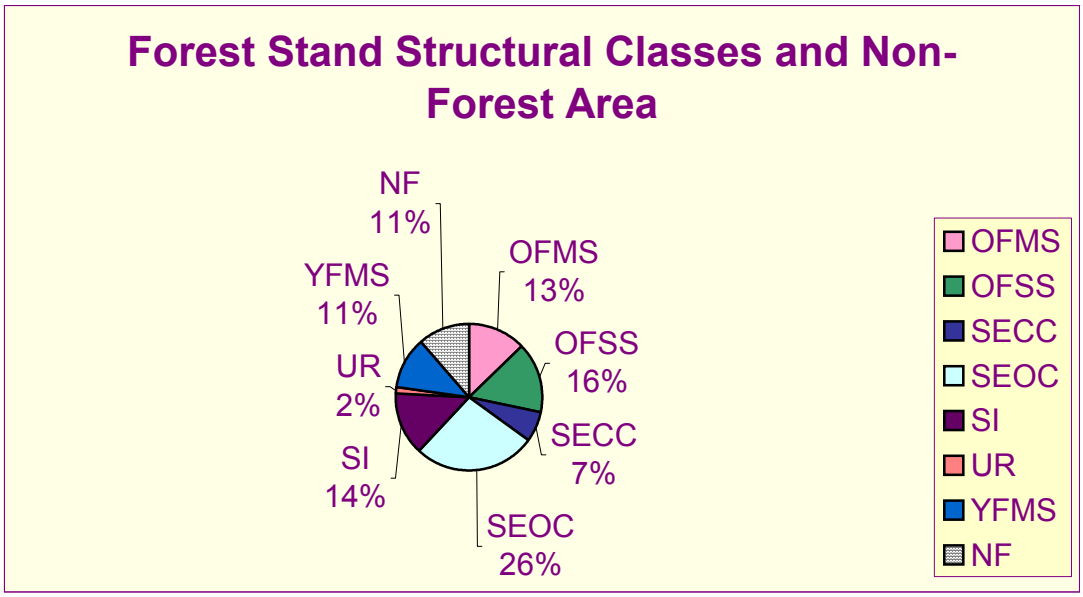


Figure 3-5. Forest Structural Stages on the Lower Sheep Planning Area

Wildlife Habitat

This section incorporates by reference the *Lower Sheep Timber Sale and Fire Reintroduction Project Terrestrial Wildlife Specialist Report* contained in the project analysis file at the Walla Walla 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 predominant scale for analyzing the effects on wildlife is the Lower Sheep Analysis Area, however, in many instances, a larger area was considered. Some information was obtained from the draft Ecosystem Analysis for the Grande Ronde River - Rondowa Watershed (USDA 1999). Where the scale of analysis changes for different wildlife species, it is evident in the discussion.

The natural diversity of forest types coupled with fire suppression and timber harvest has resulted in a very diverse array of forest stand conditions. Wildlife habitats in this area are predominantly mixed conifer forest (grand fir, Douglas-fir, Engelmann spruce, subalpine fir, western larch, lodgepole pine, and ponderosa pine); cold mesic north facing slopes; grassy or mixed conifer south facing slopes; ridge top scabland; meadows and riparian hardwood communities. Approximately 76 percent of the planning area is Moist Forest, 12 percent is Dry Forest, and less than 1 percent is Cold Forest.

Big Game Habitat

Habitat Characterization

The Lower Sheep planning area contains primarily summer range (forest habitat) throughout the area at mid and high elevations. Winter range (grassland/grass tree mosaic habitat) occurs adjacent to the Grande Ronde River. Currently the Forest Plan management strategy for this area is A7 & A8, Scenic Area, rather than C3 Big Game Winter Range. The overall total habitat availability for big game has not changed significantly in the Grande Ronde Rondowa Watershed since 1958 (USDA 1999).

Cover and Forage

A mosaic of cover and forage habitats is distributed throughout the analysis area. Satisfactory cover[5] provides valuable hiding, thermal, and escape cover for elk. Marginal cover also provides hiding and escape cover, but tree canopy is less dense and so does not provide as much protection.

Table 3-24 displays the existing condition and Forest Plan standards for cover.

Disturbance

The quality of elk habitat is influenced by the presence of humans, which causes animal stress and hunting vulnerability. This is primarily associated with motorized use of open roads and the availability of cover. Elk have been found to select habitats preferentially based on increasing distance from open roads (Rowland et al. 2000). Vulnerability and hunting mortality have been found to be higher in forested stands with greater road densities and less hiding cover (Weber et al. 2000). Many roads in the planning area have been closed to motorized vehicles since the early 1990's such that the potential for road disturbance to big game has declined in recent years. Open road densities in the Lower Sheep planning area are mostly low, generally 1 to 2 miles

[5] Satisfactory cover is defined as stands of coniferous trees 40 feet or more in height with an average crown closure of 70 percent or more. Marginal cover consists of trees that are 10 or more feet high with an average canopy closure of at least 40 percent.

per square mile. This is within the desired condition of an average of 2 miles per square mile or less Forest-wide (USDA 1990).

Management Indicator Species: Rocky Mountain Elk

Rocky Mountain elk was selected as an indicator species in the Forest Plan to represent general forest habitat and winter ranges. The Lower Sheep planning area falls within Wenaha hunt unit managed by Oregon Department of Fish and Wildlife (ODFW). Management objectives (MOs) for populations in the Wenaha unit are 4,250 elk and 1,100 deer. For the past 10 years, winter elk census numbers have remained about 60 percent below the state management objective. Elk population objectives may be set higher than what the habitat is capable of supporting over an extended period. Other factors may include high predation rate on elk calves, efficient harvest of cows, and changes in seasonal habitat use leading to vulnerability during the hunting season (Pat Fowler, WDFW, Pers. Comm).

Habitat Effectiveness Index (HEI)

The elk habitat effectiveness model (HEI) is used to predict the influence of forest management on elk and other big game species. The model uses the distribution of cover and forage areas, cover quality, and road factors to help indicate how effective an area will be in supporting big game (Thomas et al. 1988). It is intended to be a relative measure of effectiveness, and does not consider many other factors such as weather, predation, disease, nutrition, hunting, and harvest. Two major Forest Plan Management Areas in the Lower Sheep planning area were assessed using HEI: C4 – Wildlife Habitat, and E2 – Timber Management and Big Game. These allocations comprise about 80 percent of the planning area.

Table 3-24. Elk Habitat Effectiveness Index in Management Areas C4 and E2.

Mgmt Area	Indicator of Response	Existing Condition	Minimum Plan Standard
C4 Wildlife Habitat	Percent Satisfactory Cover	17.4	15
	Percent Total Cover	61	30
	Habitat Effectiveness Index (HEI)	63	60
E2 Timber and Big Game	Percent Satisfactory Cover	26	10
	Percent Total Cover	59	30
	Habitat Effectiveness Index (HEI)	62	45

The HEI value for C4 is .63, just above the Forest Plan standard of .60. Total cover is currently 61 percent with 17.4 percent in a satisfactory condition (>70% canopy closure). This is above minimum standards of 30 percent total and 15 percent satisfactory cover.

The HEI value for E2 is .62, well above the Forest Plan standard of .45. Total cover is currently 59 percent, with 26 percent in a satisfactory condition (>70% canopy closure). This is above minimum standards for E2 of 30 percent total and 10 percent satisfactory cover. Methods used to calculate HEI are described in Wildlife Appendix B.

Snag and down wood habitat

The Umatilla Forest Plan (USDA 1990) established standards for dead standing and down wood for primary cavity excavators addressing 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" (USDA 1995). This amendment requires the retention of snags and green replacement trees greater than or equal to 21 inches in diameter at breast height (or the representative diameter in the overstory) at 100 percent potential population levels for primary cavity excavators (Thomas 1979). Based on the amended direction, new snag requirements and replacement tree objectives were developed for the vegetative working groups on the Forest and documented in *"Interim Snag Guidance for Salvage Operations*" (USDA 1993).

Snags

Snag habitat was assessed at the landscape scale using the USFS current vegetation survey (CVS) inventories. CVS inventories (Brown 2003) are permanent plots on a 1.7-mile grid that samples the vegetative condition across National Forest Lands. For this analysis, we combined data for the Lower Grande Ronde River Rondowa and the Lookingglass Watersheds. Snag densities currently exceed Forest Plan standards for all forest types (Table 3-25). The CVS data likely underestimates the average snag density, since 75 percent of the CVS points are within managed areas, while only 25 percent are in less accessible roadless areas where more snags are likely available.

Decayed Wood Advisor

The Decayed Wood Advisor (DecAid) is an internet-based tool that provides a collection of research on wildlife use of snags. DecAid is not a mathematical model or wildlife/wood-decay simulator. Data provided in DecAid allows the user to compare the abundance of snag and down wood habitat to the frequency of species occurrence reported in field studies. The evaluation is based on tolerance levels (30%, 50%, & 80%), which are an estimate of the percent of use observed of a particular parameter (e.g., snag density, snag diameter, down wood density) (Mellen et al. 2003).

For the DecAid evaluation we used the Eastside Mixed Conifer Forest habitat type to compare to our CVS snag data. DecAid provided cumulative species curves based on field measurements of snag density where white-headed woodpecker, pileated woodpecker, and other cavity nesting birds were studied. The 50 percent tolerance level for these species is compared to existing conditions in the analysis area (Table 3-25).

Existing conditions (CVS estimates) for snags > 10” DBH exceed the 50 percent tolerance level for the white-headed woodpecker, but are below the 50 percent level in the > 20” DBH class. DecAid figures for this species are based on one study in eastside mixed conifer forest, in which around half (50%) of all individuals were observed in areas having >20” DBH snag densities higher than 1.5/acre. The white-headed woodpecker was most common in extensive stands of late and old ponderosa pine. Based on the historic habitat assessment and structural condition, the species could have occurred in the Grande Ronde-Rondowa analysis area, although not in large numbers because of the limited amount of capable habitat in the watershed (USDA 1999).

Existing conditions for both size classes of snags are below the 50 percent tolerance levels given for the pileated woodpecker, on average. The average for the area is 4 snags per acre greater than or equal to 20”, which is below the 50 percent tolerance level of 7 snags per acre (Table -3-25). DecAid figures are based on studies which indicated that about half the time, pileated woodpeckers were observed in areas with higher densities of snags than are currently available throughout these two watersheds *on average*. However, there are about 7,600 acres in the Grande Ronde-Rondowa analysis area (13% of the area) that exceed 10 snags per acre greater than or equal to 20 inches dbh, and about 12,000 acres (about 20% of the forested area) that exceed 30 snags per acre greater than 10 inch dbh.

Table 3-25. Average dead standing tree (snags) density in the Grande Ronde River - Rondowa and Lookingglass Watersheds compared to Umatilla LRMP guidelines and DecAid 50% Tolerance levels.

LRMP, Umatilla NF Guidelines		Grande Ronde River Rondowa & Lookingglass Watersheds CVS Data			DecAid 50% Tolerance Level Eastside Mixed Conifer Forest (snags/acre)		
Working Group	Recommended Density (snags/acre)	Potential Vegetation Group	DBH	Existing Density (snags/acre)	White-headed wood-pecker	Pileated wood-pecker	Cavity nesting birds
Ponderosa pine	2.25 >10" dbh 0.14 >20" dbh	*Dry Forest*	>10" >20"	8 1	1.9 1.5		
South Associated (Mixed conifer)	2.25. >10" dbh 0.14. >20" dbh	*Moist Forest*	>10" >20"	17 4		30 7	- 2
North Associated (Grand fir)	1.80 >10" dbh 0.14 >20" dbh						
Lodgepole pine	1.8 >10" dbh 0 >20" dbh	*Cold Forest*	>10" >20"	13 3			
Subalpine Zone	1.8 >10" dbh 0 >20" dbh						

Down Wood

Guidelines for dead wood management are based on the Regional Forester's Forest Plan Amendment #2 (USDA 1995) and the Interim Snag Guidance for Salvage Operation (USDA 1993). No data is available on the current levels of down wood in the analysis area. Adequate levels of both standing dead and down wood are believed to be present based on years of insect and disease problems, high stocking levels, and fire suppression.

Management Indicator Species: Pileated woodpecker

Pileated woodpecker was selected as an indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth mixed conifer stands. Pileated woodpeckers are relatively common in the planning area, based on incidental observations. Preferred habitat for the pileated woodpecker consists of large blocks of grand fir and mixed conifer stands in late and old structural stages with large diameter snags and down wood (Bull and Holthausen 1993). The total habitat available for the pileated woodpecker is 19 percent less than in 1958; more specifically, essential reproductive (nesting) habitat is 15 percent less (USDA 1999). Overall, the habitat quality for the pileated woodpecker in the Grande Ronde Rondowa Watershed is considered fair to good, because of the quantity and distribution of habitat in the analysis area. Primary habitat occurs in small, scattered patches that are relatively well connected throughout all elevations, and nesting habitat is well distributed across the landscape.

Management Indicator Species: Primary Cavity Excavators

The primary cavity excavator guild was selected as an indicator species in the Forest Plan to represent a vast array of vertebrate species that depend upon dead standing trees and down logs for reproduction and/or foraging. Primary cavity excavators include 15 bird species 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. Habitat for primary cavity excavators includes coniferous and hardwood stands in a variety of structural stages and the availability of dead trees in various size and decay classes (Thomas 1979). Primary habitat has the potential to provide snags greater than 15" dbh, while secondary habitat provides snags 8-15" dbh.

The overall habitat quality in the Grande Ronde-Rondowa watershed for primary cavity excavators is fair to good, because potential habitat occurs on 50 percent of the analysis area and is connected to similar habitats across the landscape (USDA 1999). Potential habitat for these species can be found throughout the planning area. However, the total amount of primary habitat has declined. Large trees for nesting and potential cavity development are available, but are not as well distributed as they were prior to active management.

Old Forest Habitat

Allocated Old Growth

The Forest Plan allocated stands between 75 and 300 acres in size as C1-Dedicated Old Growth or C2-Managed Old Growth to provide old growth tree habitat across the Forest. Old growth stands were initially classified as suitable and/or capable habitat for a selected management indicator species. Unit size and distribution are variable and depend on the vegetation type and target management indicator species (USDA 1990). Two Dedicated Old Growth (C1) areas fall within the project area: #0701, which is entirely within the Grande Ronde Scenic Area (A8), and #0711, which is partially within the Grande Ronde Scenic Area. Dedicated old growth within scenic areas is retained as part of the dedicated old growth system (USDA 1999:4-129). These stands are considered suitable pileated woodpecker habitat.

Late and Old Structure

Umatilla National Forest Plan (FP) Amendment #11 established interim riparian, ecosystem, and wildlife standards for timber sales (the Eastside Screens) (USDA 1995). The Interim Wildlife Standard (wildlife screen) restricts the harvest of timber in stands classified as late or old structure (LOS) if the amount of LOS in the area is below the historic range. Stands in the Old Forest Single Story and Old Forest Multi-Story structural stages are considered late and old structure habitat in this analysis.

In the Lower Sheep planning area, the amount of late and old structure forest is within the historic range of variability for cold and moist upland forest, however, the amount of old forest, single stratum is below HRV for dry upland forest. Therefore, harvest of LOS is generally allowed in cold and moist upland (76% of the forest in the planning area), but not in dry upland forest (12% of the forest in the planning area).

Although reductions in LOS have occurred since 1958, the total amount of LOS currently in the Grande Ronde River / Rondowa Watershed is near a "desirable level" for wildlife (USDA 1999). Late and old forest structure occurs on about 32 percent of the forested land, and it is well distributed throughout the Lower Sheep planning area.

Connectivity

The Interim Wildlife Standard also requires that connectivity between blocks of late and old structure (LOS) stands be evaluated. Connective habitat does not necessarily need to meet the same description of old forest habitat, but provides "free movement" between LOS stands for various wildlife species associated with old forest conditions. For the majority of the planning area, LOS stands and OG areas are connected to each other with medium (9-15" dbh) to large trees (>15" dbh), stands with variable widths greater than 400 feet, and attached with two or more different connections. Connective stands are primarily in the Young Forest Multi-Strata, Stem Exclusion Closed Canopy, and Understory Regeneration structural stages. The least connected areas include non-forested areas, stands where past timber harvest occurred, and areas with natural mortality.

Additional information and maps regarding HRV and the interim wildlife standards can be found in Appendix G.

Management Indicator Species: Northern Three-toed Woodpecker

The northern three-toed woodpecker was selected as an indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth lodgepole pine stands. Overall habitat quality for the three-toed woodpecker in the Grande Ronde-Rondowa Watershed is considered poor to marginal, because of the limited amount of habitat availability (small patches), widely scattered habitat patches, and the limited amount of old forest condition in the cold and cool forest types (USDA 1999). The Lower Sheep planning area contains one small patch of primary reproductive habitat (~75 acres), which is not connected to primary

foraging or secondary habitat. It is unlikely that three-toed woodpeckers currently exist in the Lower Sheep planning area except as occasional foragers. The three-toed woodpecker will not be affected by the proposed activities because there are no proposed activities in mature or old growth lodgepole pine. Therefore, no further analysis of environmental effects will occur for the three-toed woodpecker.

Management Indicator Species: American Marten

The American marten was selected as an indicator species in the Forest Plan to represent complex mature and old growth stands. Preferred habitat for the marten consists of high elevation (> 4000') stands of dense conifer and down wood often associated with streams. The historic population density and distribution of marten is unknown, but they probably occurred in the area in low numbers. Habitat capability is moderate, because of the large amount of primary habitat that was available in 1958, however, current habitat quality in the Grande Ronde-Rondowa Watershed is considered poor (USDA 1999). Past timber harvesting may have removed a significant portion of what was former marten habitat. Within the Lower Sheep planning area, dense, mature conifer habitat near streams is mainly found along the upper reaches of Jarboe Creek. No activities are proposed in these areas; therefore, no further analysis of environmental effects will occur for American marten.

Threatened, Endangered, and Sensitive Wildlife Species

Federally listed species includes those identified as Endangered, Threatened, Proposed, or Candidate species by the U.S. Fish and Wildlife Service (USDI 1999). "Sensitive" species are those identified on the Regional Forester's (R6) Sensitive Animal List (USDA 2000) that meets National Forest Management Act obligations and requirements. Sensitive species addressed on the Umatilla National Forest include those that have been documented or suspected (likely to occur, based on available habitat to support breeding pairs/groups) and occurring within or adjacent to Forest boundary.

Based on District records, surveys, and monitoring, as well as published literature about distribution and habitat utilization, species that may occur in the analysis area include the gray wolf, Canada lynx, northern bald eagle, peregrine falcon, California wolverine, Rocky Mountain bighorn sheep, and Columbia spotted frog. The gray flycatcher, upland sandpiper, northern leopard frog, and painted turtle are not expected to occur in the planning area. These four species and their habitat would not be affected by the proposed activities; therefore, no further analysis of the environmental effects on these species will be performed.

Gray wolf (Endangered).

The wolf was extirpated from the region by the early 1900's. Recent successful reintroduction programs in Idaho and Montana have increased wolf populations in the northern Rocky Mountains. Individual gray wolves have dispersed from Idaho into the Blue Mountains, but as of yet no packs have formed to our knowledge. The Idaho wolf population has been increasing steadily, and dispersion into the Blue Mountains will likely continue. There have been no verified tracks or sightings of gray wolf within the planning area. There is a slight chance that a wolf could pass through the general project area. There are currently no known denning or rendezvous sites near this project or on the District.

Canada lynx (Threatened).

The historic presence of lynx in Oregon is documented by nine museum specimens collected from 1897 to 1927. Verified records after that time are extremely rare. Only three recent specimens are known, and all were collected in anomalous habitats within several years of lynx population peaks in western Canada. Verts and Carraway (1998) consider it unlikely, given the existence of only nine specimens from appropriate habitat, that self-maintaining populations of lynx existed in Oregon in historic times.

Based on the lack of reproduction records, limited verified records of lynx, low frequency of occurrences, and correlations with cyclic highs with populations in Canada, the U.S. Fish and Wildlife Service concluded that lynx could occur in Oregon as dispersers that have never maintained resident populations (USFWS 2003).

Seven unconfirmed visual observations of lynx were reported on the Walla Walla Ranger District between 1986 and 2002. Three occurred west of Tollgate and four occurred south of Tollgate along Oregon State

Highway 204. A Forest Service employee has also reported seeing a lynx near Jubilee Lake. Most of these sightings are within 10 to 15 miles of the Lower Sheep planning area.

Due to similarities with the more common bobcat (Lynx rufus), sightings are generally suspect. A larger, grayer subspecies of bobcat (Lynx rufus pallescens) is generally found in eastern Washington (Stinson 2001). Highway 204 is a well-traveled highway through the mountains. The repeated sightings over the years, combined with the experience of some of the people who reported the sightings, gives the reports some validity, however no physical evidence has been obtained (i.e. no tracks were measured or photographed, no hair was collected, and no photographs were taken of the animal).

In addition to numerous snow track surveys in the early 1990's, extensive field surveys for lynx were conducted on the Umatilla National Forest from 1999 to 2001. The North Fork John Day Ranger District surveyed approximately 125 square miles of potential lynx habitat using the National Lynx Detection Protocol (McKelvey et al. 1999). Surveys were based on the natural cheek-rubbing behavior of cats. The detection method used a scented, studded, carpet pad to collect facial hair. Hair was collected from carpet pads for three consecutive years. DNA analysis showed that none of the hair collected were from lynx. The neighboring La Grande Ranger District conducted similar surveys and did not detect any lynx.

Additional hair snag surveys were completed in association with USFWS, using similar, but less extensive methods. On the Umatilla NF, nine areas were sampled by the USFWS using their protocol. One survey area was near Jubilee Lake, centered about 5 miles west of the Timothy LAU, and another at Fry Meadow, within the Lower Sheep planning area. None of these surveys resulted in the detection of lynx.

Various viewpoints about lynx distribution and lynx habitat were considered by the authors of the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). This publication along with subsequent recommendations from the Lynx Steering Committee represents the most credible and applicable synthesis of science concerning ecology and management of lynx and lynx habitat in the contiguous United States.

Canada lynx occur predominately within boreal forest types (Ruggiero et al. 1994, Ruggiero et al. 1999). In the western mountains of the United States, components of boreal forest include subalpine fir, Engelmann spruce, and lodgepole pine as major seral species (Ruggiero et al. 1999). Wisdom et al. (2000) generally describes primary habitat for lynx as subalpine fir and montane forests that have cold or moist forest types. Source habitat includes subalpine fir, Engelmann spruce, interior Douglas-fir, western larch, lodgepole pine, and grand fir forest types. However, study areas where lynx have been investigated in the western United States (Montana, Washington, and Wyoming) all report subalpine fir, Engelmann spruce and lodgepole pine as occupying a large portion of the study areas. Lynx generally did not use the drier vegetation types such as ponderosa pine or Douglas-fir where it occurred in these study areas (Koehler 1990, Koehler and Brittell 1990, Ruggiero et al.1999).

In this analysis, primary vegetation that contributes to lynx habitat includes subalpine fir habitat types where lodgepole pine is a major seral species, generally between 4,100-6,600 feet in elevation. Secondary vegetation, when interspersed or adjacent with subalpine forest may also contribute to lynx habitat. This includes (cool) moist grand fir and moist Douglas-fir habitat types (Ruediger et al. 2000 and Ruggiero et al. 1999). Foraging in lynx habitat occurs primarily in early to mid successional stages where snowshoe hare occur in high numbers (Ruggiero et al. 1994, Ruggiero et al. 1999, Ruediger et al. 2000). Within lynx habitat, late successional stages with large woody debris are generally used for denning, rearing young and hunting alternate prey species (Ruggiero et al. 1994, Ruggiero et al. 1999, Ruediger et al. 2000).

The scale of analysis for lynx is the 35,083-acre Timothy Lynx Analysis Unit (LAU), which represents a typical expected lynx home range in the southern portions of lynx distribution. Watershed lines, roads, and ownership boundaries are generally used as LAU boundaries. Lynx habitat on the Umatilla National Forest was determined using the criteria provided by the Lynx Steering Committee in a letter dated August 22, 2000. A large number of stands in the LAU were reviewed in the field. The rest are classified based on the forest vegetation database, and fall primarily within the Wenaha-Tucannon Wilderness. Out of 35,038 acres of lynx habitat, 8,495 acres (24.2%) are currently in an unsuitable condition for lynx foraging or denning (Table 3-26.) The current recommendation is that if more than 30 percent of lynx habitat within an LAU is currently in

unsuitable condition, no further reduction of suitable conditions should occur from vegetation management activities.

Table 3-26: Lynx habitat condition in the Timothy LAU.

Timothy LAU	Acres	Percent
Foraging	21,573	62 %
Denning	4,970	14 %
Unsuitable	8,495	24 %
Total lynx habitat	35,038	100 %

Bald Eagle

The historic population density and distribution of bald eagles in the analysis area is unknown. However, it is assumed that both wintering and nesting eagles were once common in the watershed along the Grande Ronde River (USDA 1999).

A bald eagle nest site (Rondowa) was identified about one mile south of the planning area boundary in 1994. Although eagles have been observed there during the nesting period at least six different years, it is unknown if nesting efforts ever resulted in successful reproduction. The identified nest is now gone, however in 2004 an eagle was observed in the area during the nesting period.

The potential for bald eagle nesting and wintering in the Grande Ronde-Rondowa Watershed is fair to good, because of the limited public access to the river, the availability of large, dominant trees, and the proximity of big game winter range which would provide a source of carrion.

Peregrine Falcon

Preferred peregrine falcon habitat includes various open habitats from grassland to forest in association with suitable nesting cliffs. The falcon often nests on ledges or holes on the face of rocky cliffs or crags. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey. Falcons are known to forage over large areas, often 10 to 15 miles from the eyrie, in woodlands, open grasslands, and bodies of water (ABI 2000). General observations of peregrines have occurred throughout the District in potentially suitable habitat without the detection of a single eyrie. Potential nesting habitat near the Lower Sheep planning area is generally limited to a few cliffs along the Grande Ronde River. Additional habitat occurs in the Wenaha-Tucannon Wilderness, north and west of the watershed.

California Wolverine

Wolverine typically inhabit high elevation conifer forest where sufficient food is available and human activity is low. Denning habitat is usually open rocky talus slopes where snow depths remain over 3 feet into spring. They tend to forage over large areas and travel long distances.

The majority of the planning area is suitable for wolverine foraging. Marginal natal denning habitat may be available to the north of the planning area in the Wenaha-Tucannon Wilderness. No potential denning areas are known in the planning area. The habitat analysis for wolverine indicates that the amount of available habitat has not changed over the past 50 years (USDA 1999). Other factors, such as roads and other human disturbance could affect wolverine use of the area.

Miscellaneous unverified sightings have been reported in the last 10 years on the Umatilla National Forest. No sightings or tracks were observed during winter snow-track surveys conducted in 1991 and 1992 across the District for wolverine, fisher, American marten and lynx. There are no indications that wolverine do more than potentially pass through the area.

Bighorn Sheep

Rocky Mountain bighorn sheep were native to much of the mountain and canyon country in northeast Oregon and southeast Washington, but were gone from the region by 1945. Reintroductions of Rocky Mountain bighorn sheep into the Wenaha-Tucannon Wilderness occurred in 1983, 1984 and 1986. California bighorn sheep were also stocked along the Tucannon River in 1960 and Asotin Creek area in 1973. These sheep may have eventually joined the Wenaha-Tucannon herd (USDA 1999).

While the majority of bighorn sheep occur in the Wilderness, sub groups occur around Troy and along the river. They have been observed along the Grande Ronde River as far south as Alder Creek, just northeast of the Lower Sheep planning area (Vick Coggins, ODFW, Pers. Comm.). Additional potential habitat along the Grande Ronde River occurs south and east of the Lower Sheep planning area. Preferred habitat for bighorn sheep consists of rugged, open to semi-open areas of coniferous grassland or grass/shrub plant communities that affords high visual contact with their surroundings. Expanses of rim rock, cliffs, and rocky outcroppings are especially important for lambing and escape from predators. Grasses make up the staple forage species, complemented seasonally with forbs and shrubs. Most northeast Oregon bighorn herds have excellent grassland ranges with abundant food (ODFW 2003).

The Management objective for bighorn sheep in the Wenaha-Tucannon bighorn sheep herd unit is 140 animals in Washington and Oregon. The herd experienced a major die-off during the winter and spring of 1995-1996 attributed to *Pasteurella* pneumonia, which reduced the population by about 50 percent. *Pasteurella*, scabies, and lungworms continue to threaten the health and survivability of the herd. Since 1996, the herd has remained small but stable; in 2003 the population was estimated at 65 animals (ODFW 2003).

Columbia Spotted Frog

Suitable habitat for the spotted frog can be found in the planning area in streams, ponds, and marshy areas with abundant aquatic vegetation. Spotted frogs may be present in the planning area, although they have not been observed. Formal inventories have not been conducted. Spotted frogs have been observed along the west slope of the Blue Mountains, between Interstate 84 and Dayton (Karen Kronner, Wildlife Biologist, Pers. Comm.).

Other Species of Interest:

Bats

The U.S. Fish and Wildlife Service have listed six bat species as a "species of concern:" the pale western big-eared bat, small-footed myotis, long-eared myotis, fringed myotis, long-legged myotis, and Yuma myotis. Many of these species are considered uncommon or their status is unknown in the Pacific Northwest. Some bat species are inherently more rare in the Blue Mountains than others. The long-eared bat is considered "the most abundant bat in northeastern Oregon forests," while the Yuma myotis is considered "exceeding scarce" (Whitaker et al. 1981:282). Bats have not been specifically surveyed (mist-net or bat detection devices) within the planning area.

Availability and quality of roost sites are thought to be critical factors influencing population size and distribution of some bat species (Sallabanks et al. 2001). Forest dwelling bats often use large-diameter snags and trees as resting sites. Snag habitat was assessed at the landscape scale using the USFS current vegetation survey (CVS) inventories. CVS inventories (Brown 2003) are permanent plots on a 1.7-mile grid that samples the vegetative condition across National Forest Lands. Average snag densities in the Grande Ronde River / Rondowa and Lookingglass watersheds currently exceed Forest Plan standards. The density of snags over 10 inches DBH ranges from 8 to 17 per acre depending on forest type. The density of snags over 20 inches DBH ranges from 1 to 4 snags per acre (Table 3-25). Higher densities of snags are likely present in patches. The proximity of snags to water and riparian habitat may be an important factor determining snag use by bats for roosting (Arnett and Hayes 2004).

Birds

Of the 28 species of birds listed as "birds of conservation concern" in the Northern Rockies bird conservation region (USDI 2002), nine potentially occur in the Lower Sheep planning area. Seven of these nine species are

focal species in the Conservation Strategy for Landbirds (Altman 2000). These species are also addressed in other sections of this wildlife report (i.e. management indicator species, threatened, endangered and sensitive, or Neotropical migratory bird sections). The following additional birds of conservation concern and birds of local interest may occur in the Lower Sheep planning area: prairie falcon, golden eagle, and northern goshawk.

Prairie falcon. Falcon habitat includes various open habitats from grassland to forested in association with suitable nesting cliffs. There are a few known prairie falcon nesting areas on the forest. Possible nesting habitat may be found near the Lower Sheep planning area along the Grande Ronde River, but the potential has not been assessed. Additional habitat occurs in the Wenaha-Tucannon Wilderness, north and west of the watershed.

Golden eagle. Golden eagles generally forage in shrub-steppe, grassland, juniper, and mixed conifer / deciduous habitat. They are often seen searching for prey (usually jackrabbits) in more open areas that contain a shrub component. They usually nest on ledges along rims and cliffs but also may utilize large mature trees. Golden eagles may occasionally frequent portions of the planning area, particularly on the east side near the Grande Ronde River breaks. No nesting activity has been reported in the affected area.

Northern goshawk. Preferred habitat for the goshawk consists of coniferous forests with a variety of structural stages for nesting and foraging. Nesting sites typically consist of a dense cluster of large trees, surrounded by a similar forest type with a more open overstory. No nest sites have been located in the planning area, although some may exist. Foraging and nesting habitat is readily available in the planning area.

The Conservation Strategy for Landbirds (Altman 2000) identifies three priority habitat types: Dry Forest, Mesic Mixed Conifer, and Riparian Woodland and Shrub. Several "unique" habitats are also important.

The *Dry Forest* habitat type is characterized as coniferous forest composed exclusively of ponderosa pine, or dry stands co-dominated by ponderosa pine and Douglas-fir or grand fir. It is generally at lower elevations and mostly on xeric, upland sites with shallow soils. The desired condition is a large tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover, scattered shrub cover, and pine regeneration. The conservation focus includes the following habitats conditions: large patches of old forest with large trees and snags; old forest with interspersed grassy openings and dense thickets; open understory with regenerating pines; and patches of burned old forest. Focal species include: white-headed woodpecker (large patches of old forest with large trees and snags), flammulated owl (old forest with interspersion of grassy openings and dense thickets), chipping sparrow (open understory with regenerating pines, and Lewis' woodpecker (patches of burned old forest).

The dry forest type comprises 11 percent of the analysis area (2700 acres). The historic range of variability analysis for this area indicates that 15-55 percent of dry forest stands would occur in the Old Forest Single Structure (OFSS) stage. Current conditions are just below the historic range at 14 percent. Many of the OFSS stands are now multi-structured because Douglas-fir and grand fir have become established in the understory.

Late Successional Mesic Mixed Conifer habitats are primarily Douglas-fir and grand fir sites that are generally higher elevation, wetter, on northerly aspects, and in draws where soils are mesic. The desired condition is a multi-layered old forest with a diversity of structural elements. The conservation focus is on the following five habitat conditions: large snags; overstory canopy closure; structurally diverse and multi-layered; dense shrub layer in forest openings or understory; and edges and openings created by wildfire. Focal species include Vaux's swift (large snags), Townsend's warbler (overstory canopy closure), varied thrush (structurally diverse, multi-layers), MacGillivray's warbler (dense shrub layer in forest openings or understory), and olive-sided flycatcher (edges and openings created by wildfire).

Mesic mixed conifer (moist upland forest) occurs on 74 percent of the planning area (17,755 acres). The Historic Range of Variability analysis for this area indicates that 10-30 percent of these stands would

occur in the Old Forest Multi Structure (OFMS) stage. Current conditions are within this range at 13 percent OFMS in the planning area. Large snags are well distributed and diverse structure is common within these OFMS stands. Dense shrub layers within these types are less common but occur in patches. Edges and openings created by wildfire are rare to nonexistent in the planning area.

The desired condition of *Riparian Woodland and Shrub* habitat for birds is a structurally diverse vegetative community of native species that occur in natural diversity relative to hydrological influences. The conservation focus includes the following habitat conditions: large snags; canopy foliage and structure; understory foliage and structure; and willow/alder shrub patches. Riparian vegetation is particularly important to Neotropical migratory songbirds (Sallabanks et al. 2001). Focal species include: Lewis' woodpecker (large snags), red-eyed vireo (canopy foliage and structure), veery (understory foliage and structure), and willow flycatcher (willow/alder shrub patches). Riparian vegetation is in relatively good condition on most stream segments. Major drainages include Jarboe, Sheep, and Meadow Creek. Many springs, seeps, and ponds also provide small patches of riparian habitat.

Focal species for *Unique* habitats include: hermit thrush (subalpine forest), upland sandpiper (montane meadows), vesper sparrow (steppe shrubland), red-naped sapsucker (aspen), and gray-crowned rosy finch (alpine). No steppe shrublands or alpine habitats occur in the planning area. A small amount of subalpine habitat occurs in the highest elevations. Montane meadows in the area include Brock, Jarboe, Fry, Kettleson, and Swikert meadows. Habitat restoration projects are ongoing at Jarboe and Brock meadows. Aspen is present in many of these meadows as well as along riparian areas.

Neotropical migratory birds

Neotropical migratory birds (NTMB) are species which nest in North America and migrate to Central and South America for the winter. Neotropical migrants account for a significant portion of the avian biological diversity in the planning area. Over the past two decades, declines in many NTMB species have been noted, including many that nest in the Blue Mountains. Causes for the declines include habitat degradation in winter and summer habitats and the continued use of toxic pesticides in Latin America (Sharp 1992).

The Grande Ronde Rondowa watershed analysis lists 23 NTMB species as having "significant declining trend" based on Andelman and Stock (1994). The Interior Columbia Basin Ecosystem Management Project (ICBEMP) also assessed NTMB in the basin under various management themes (Saab and Rich 1997). Several species identified as a "high concern to management" occur in the area: Lewis woodpecker, olive-sided flycatcher, pine siskin, and western meadowlark.

Most NTMB species are dependant on coniferous forests and riparian habitats. While these habitats occur in the planning area, there are fewer distinct habitat types, an imbalance of structural diversity, and an increasing number of small patches of habitat that are scattered across the landscape that limit habitat suitability. Left unchecked, these changes could lead to a reduction in habitat quality for many bird species that depend on a variety of structures, habitat types, and large patches of habitat to function overtime in the landscape (USDA 1999).

Cultural

The Lower Sheep analysis area is situated on the Walla Walla Ranger District of the Umatilla National Forest, approximately 25 miles southeast of Walla Walla, Washington. Roughly 39 heritage resource inventories have been conducted within the project area boundary. Two of these were comprised of large-scale pedestrian inventories that covered 100 percent of the high probability land within the analysis area. The remaining surveys were conducted on a project case-by-case basis in order to determine possible effects of proposed undertakings on sites eligible to or listed on the National Register of Historic Places (NRHP). One of the 39 inventories pre-date the current Umatilla National Forest inventory standards and will not be considered adequate coverage. However, all of these areas have since been re-surveyed according to current standards. As a result of these surveys, the entire Lower Sheep analysis area within the Walla Walla district has been surveyed.

As a result of the above inventory projects approximately 47 heritage properties were located within the Lower Sheep analysis area. Twenty-one of these properties are isolated artifacts and are not considered eligible for inclusion in the NRHP. The remaining 27 properties consist of 17 Euro-American sites, and 10 Native American sites. The balances of Euro-American site types within the analysis area are generally related to homesteading, grazing activities, and U.S. Forest Service administrative sites. The Native American sites are evidence for tool manufacturing activities that may be related to hunting and root and berry collecting camps. The distribution of sites and isolates also lends itself to the possibility of routinely used travel routes or corridors within the area, probably to access food resources, camps, and other special interest areas. Several areas within the analysis area are mentioned in Minthorn's report, *Mits Qooi Nux Kin Na Noon Im Watsus Pa*: *A Partial Traditional Use Area Inventory of the Umatilla National Forest and the Wallowa-Whitman National Forest*, (Minthorn 1994), and identified as cultural areas of interest to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). None of these areas are within proposed project areas.

There are two historic sites located within, or immediately adjacent to, proposed activity areas. The first site (04N40.OE29/01) is located immediately adjacent to proposed Unit #110. A small segment of new road construction is also proposed within the site boundary. The second site (04N40.OE34/01) is located within proposed Unit #85. These sites have not been evaluated for their National Register eligibility and thus are considered eligible to the NRHP.

Transportation System

The project area is accessed via Forest Road 62 from the west and east, Forest Road 6231 from the south, Forest Road 6413 and Forest Road 6415 also from the west and east. Forest Road 62 intersects with Forest Road 63 and Union County Road 83 in the southwest and with Wallowa County Road 570 in the east near Troy, Oregon. There are approximately 122 miles of road in the planning area. The Walla Walla District Access and Travel Management Plan designates 46.1 miles as open, 8.2 miles as seasonal, 4.2 miles as restricted, and 62.4 miles as closed. Open roads are available and maintained for passenger vehicles; other roads would require high clearance vehicles.

There are 122 miles of aggregate surface roads. There are 62.4 miles of maintenance level 1(closed roads); 30.3 miles of maintenance level 2; 20.5 miles of maintenance level 3; 8.7 miles of maintenance level 4. Annual maintenance occurs on level 3 and 4 roads. Many of the roads have not been used for many years and need log out, brushing, surface rock replacement, and ditches cleaned before use.

Total road density for the planning area is 2.75 miles per square mile with an open road density of 1.44 miles per square mile. Road density for Management Area C4 is 4.45 miles per square mile with an open road density of 1.13 miles. The total road density of Management Area E2 is 2.30 miles per square mile with an open road density of 2.08 miles per square mile.

This area was studied in the late 1990s for road decommissioning. Recommendations were made and roads no longer needed for the system were decommissioned. The access and travel management plan was adopted in 1993; open, closed, restricted, and seasonally open roads were determined for protection of wildlife and no changes to this plan are necessary. The proposed temporary roads are for short-term use and a roads analysis was not needed.

Wild & Scenic Area – Grande Ronde

The Lower Sheep Project is located in the Oregon portion of the Grande Ronde Wild and Scenic River. The Wild and Scenic River corridor is a quarter mile wide and designated A7 – Wild and Scenic River in the Umatilla National Forest's Land and Resource Management Plan (Forest Plan). The upper slopes of the canyon are designated A8 – Scenic Area. This portion of the planning area is also within the Grand Ronde Inventoried Roadless Area. Landscape prescribed fire is the only activity proposed within the Wild and Scenic River corridor and the upper canyon areas, A8, that could be viewed from the river.

Table 3-27. Acres in A7 and A8 impacted by the Proposed Landscape Prescribed Fire

Forest Plan Management Area	Total Acres within Fuel Reduction Areas	Grasslands	Dry Forest	Moist Forest
A7 Wild and Scenic River	1,180	460	700	20
A8 Scenic Area	2,190	950	970	270

The *Wallowa and Grande Ronde Rivers Final Management Plan/Environmental Assessment* of December, 1993 (FMP EA) established the management direction for the Wild and Scenic River and identified the Outstanding and Remarkable Values, FMP EA pages 16 to 20; 61 to 66. The FMP EA designated this portion of the Grande Ronde as Wild. Applicable guidelines for actions include:

- For Scenery: Preserve the existing landscape within the wild section. Any change should be very low and must not attract attention.
- For Social: Maintain physical resource base necessary for the continuation of recreation-based industries.
- For Biological: Management activities within the corridor will balance flora, fauna, and physical element conditions in conformance with the vision statement. "Our vision is to protect and/or enhance the physical, biological, social, economic, cultural, and other special qualities that give the free-flowing Grande Ronde River its unique character. …"
- For Water: Resource management actions within the corridor will meet minimum water quality standards as set by Oregon Department of Environmental Quality.
- For Land: Reintroduce fire as an effective vegetative management tool through the use of prescribed burns. Eliminate or reduce to acceptable levels of fuel build-up and hazards that are a result of past management and/or natural catastrophic events, insofar as this does not conflict with the protection and enhancement of Outstanding and Remarkable Values.

Roadless Area and Undeveloped Areas

Approximately 4,500 acres of the 17,750 acre Grande Ronde Roadless Area is within the Lower Sheep Planning Area boundary. The Lower Sheep Timber Sale and Fire Reintroduction Project proposes approximately 3,400 acres of landscape prescribed fire within the Roadless Area; there would be no timber harvest or road construction. The Umatilla National Forest Land and Resource Management Plan (Forest Plan) Appendix C, pages C - 100 to C – 111, identifies the following Roadless Characteristics:

- Landscape Character and Scenic Integrity: The Grande Ronde Roadless Area is a deep, rugged, sparsely vegetated canyon cut into a plateau covered in conifers. Distinguishing features are steep slopes covered with grass or a mosaic of grass and conifers interspersed with basalt outcrops. Human influences have had little impact on the natural appearance or ecology of the area. Fire has been, and mostly likely will continue to be, the factor with the most potential to impact the quality of the area. Nearly all human activity takes place near the canyon bottom, all fuels are upslope and have a high rate of spread and the steep, rocky slopes make control difficult. Fire has been the key to the long-

term ecological changes and vegetative succession of the area. Fires which have occurred have helped to maintain the ecosystems present.

- Primitive Experience: The primary attractions of the Grande Ronde area are the recreation opportunities associated with the river or accessed by the river. There are no trails into this portion of the canyon. River users are able to drift by boat or raft, experience three gentle gradient rapids, view steep canyon walls, occasionally encounter other persons, and hear only the river, making it a unique experience in northern Oregon. A float trip provides a sense of solitude. Screening vegetation and the abrupt rise of the banks away from the river make the upper canyon slopes difficult to view from most campsites along the river.
- Habitat for threatened and endangered species: Bald eagles use the area as a winter migrant. The portion of the Grande Ronde River within the planning area is mainly a migratory route and overwintering habitat for listed anadromous fish and bull trout. The waters become too warm in the summer for rearing habitat. Bull trout would move out of this section of the river during the summer. Fall chinook salmon spawn below Troy, 18 to 20 miles away. Snake River steelhead trout pass through and utilize the limited spawning habitat in the lower tributaries. Spring and summer chinook are not known to spawn in the Grande Ronde River. The area below Lookingglass Creek provides rearing habitat because of the mixing of cold water from Lookingglass Creek but is 3 miles above the roadless area. Bull trout would also pass through the area during winter and spring while the waters are cold.

The District inventoried for undeveloped areas and did not locate areas that would be greater than 1,000 acres.

Visual Quality

There are 324 acres of A4 along the northern border of the project planning area adjacent to the Wenaha-Tucannon Wilderness. There are no project activities taking place near this area.

There are approximately 3,100 acres of A8 - scenic area within the Grande Ronde canyon. This is described as part of the Wild and Scenic River corridor.

The Lookout Mountain viewing area (A9), overlooking Alder Creek and Bear Creek drainages of the Grande Ronde River, is located in the northeast corner of the project planning area. No activities are planned near this area nor will any activity affect the view.

Range

Grazing – The entire Brock Cattle & Horse (C&H) Allotment and a portion of the North End Transitory Sheep & Goat (S&G) Allotment falls with in the Planning Area.

- Brock C&H - This grazing allotment consists of two pastures; the Transitory Pasture which is 753 acres in size and the Pearson Pasture which is 632 acres in size (includes 345 acres of private land). The Annual Operating Plan sets the direction for grazing, the on and off dates and the amount of time in each pasture. The Transitory Pasture is stocked each year from June 10 through August 15 with 81 cow/calf pairs. These cattle are moved to the Pearson Pasture on August 16 and allowed to graze until October 15 at which time they are either moved unto adjacent private land or hauled out of the area by truck. Livestock water on the allotment is provided by either stock ponds or streams.
- North End Transitory S&H – This grazing allotment is approximately 122,310 acres in size and comprised of six grazing units used by four bands of sheep each year from June 1 through October 9. A band of sheep consists of 1000 ewes with lambs. With four bands of sheep and six units, two units are allowed to be either rested or deferred each year. This allotment has not been stocked since 2001 by the choice of the permittee. The Annual Operating Plan sets the direction for grazing, the on and off dates and the amount of time spent in each unit. The entire Planning Area is located in the Jarboe Unit. Transitory range (grazing created by timber harvest) provides most of the forage in this unit and

the remainder of the allotment. Livestock water in this unit is provided by either stock ponds or streams.

Figure 3-6: Lower Sheep Area

2004 Aerial Insect and Disease Survey

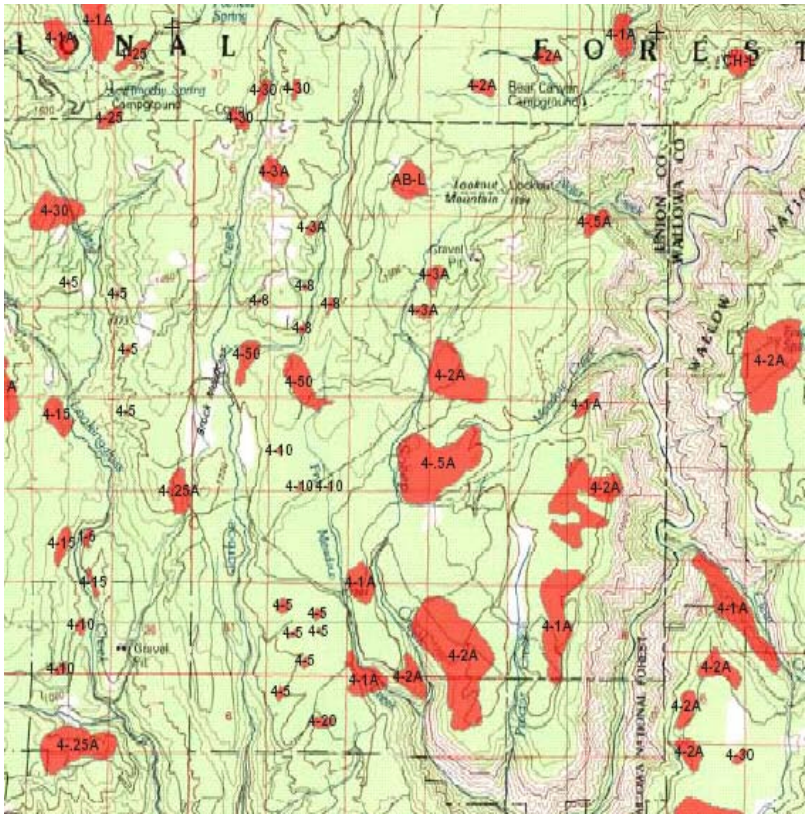


Figure 3-6. Lower Sheep Area 2004 Aerial Insect and Disease Survey

Pest Management

Noxious Weeds

Current Weeds Present, Existing Condition: The planning area covers approximately 26,343 acres, including 2,443 acres of private land (weed status on private lands is not known). Sites of 14 weed species that are presently on the Umatilla National Forest's Noxious Weed List (1998) have been documented on 966 gross acres (21 net infested acres) of the Lower Sheep planning area. Two of the top priority species, tansy ragwort (*Senecio jacobaea*) and yellow star-thistle (*Centaurea solstitialis*), have not appeared for the last several years giving indication they were eradicated. The sites continue to be tracked and monitored. (See Noxious weed report for detailed list).

Approximately one-third of these sites are covered by the 1995 Decision implementing the Environmental Assessment for the Management of Noxious Weeds. This 1995 EA allows the possible use of herbicides on the sites listed in the EA, depending on site and weed species.

Forest Insects and Diseases in the Lower Sheep Planning Area

Current Conditions

Each autumn, the Regional Forest Service Pest Management team maps visually apparent insect and disease presence in the forest from an airplane. The results of the mapping in 2003 showed a moderate level of activity in the Lower Sheep planning area. The primary tree mortality was from fir engraver, which attacks primarily true firs. A total of 3,719 acres of fir engraver damage was mapped. There were 10 acres of western pine beetle damage, mostly on ponderosa pine but a small amount also on western white pine. No tussock moth defoliation was observed. Mapping in 2004 showed similar results.

The Blue Mountain Zone forest entomologists and pathologist visited several stands in the planning area in 2002 and 2003, and prepared reports of their observations (see Project Analysis file). The primary findings were that the Douglas-fir tussock moth population was returning to its endemic level, and that there is root rot and fir engraver in stands dominated by grand fir.

Figure 3-7

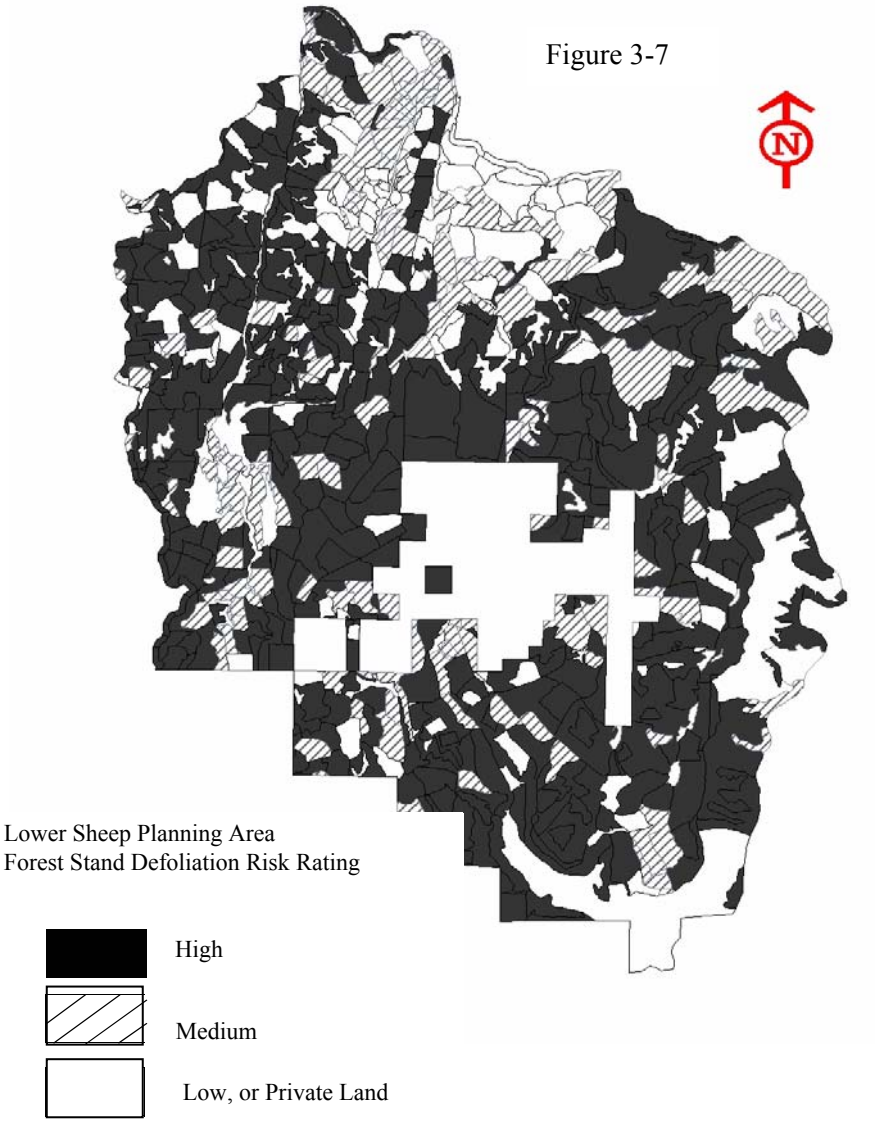


Figure 3-7. Forest Stand Defoliation Risk Rating

Susceptibility to Insects and Disease

In addition to current damage, the stands in the planning area are susceptible to future damage from various insect and disease agents. The tables below show hazard ratings for several agents. These hazard ratings were calculated using stand attributes in the Lower Sheep vegetation database and using methods from "Risk rating forest stands for insect and disease impacts: a simplified approach using aerial photography data" (Schmitt and Powell 2002).

Defoliators

The planning area is highly susceptible to defoliators of true firs and Douglas-fir because of the high number of stands dominated by grand fir and Douglas-fir. Many of these stands are moderately stocked, some are heavily stocked, and many have more vertical stories than in the past when wildfires moved through more frequently. Both Douglas-fir tussock moth (*Orgyia pseudotsugata)* and western spruce budworm (*Choristoneura occidentalis)* have the potential to cause high levels of tree mortality and/or deformity and loss of growth. These insects return to the forest periodically and can create levels of damage ranging from light, where tree crowns are partially defoliated, to extreme, where most of the trees in stands over a large area are killed.

Tussock moth populations are cyclic, rising on average about every 9 years in the western United States. Not every population peak results in an outbreak – in northeastern Oregon, it appears that an outbreak coincides with every second or third population peak. Budworm outbreaks tend to be cyclic, with eruptive episodes covering large landscapes every 15 to 30 years. Forests comprised mostly of pines or western larches have little defoliation risk because those species are seldom fed upon by western spruce budworm (Powell 2002).

Table 3-28. Defoliation Hazard Rating in the Lower Sheep Planning Area

Defoliation Hazard Rating	Acres of Forest Land	% of Acres
High	14,434	55%
Medium	4,245	16%
Low	4,230	16%
None	3,436	13%

The last large tussock moth infestation in the area returned from epidemic to endemic levels in 2002. The following graph shows average pheromone trap data for Washington and Oregon on the vertical axis.

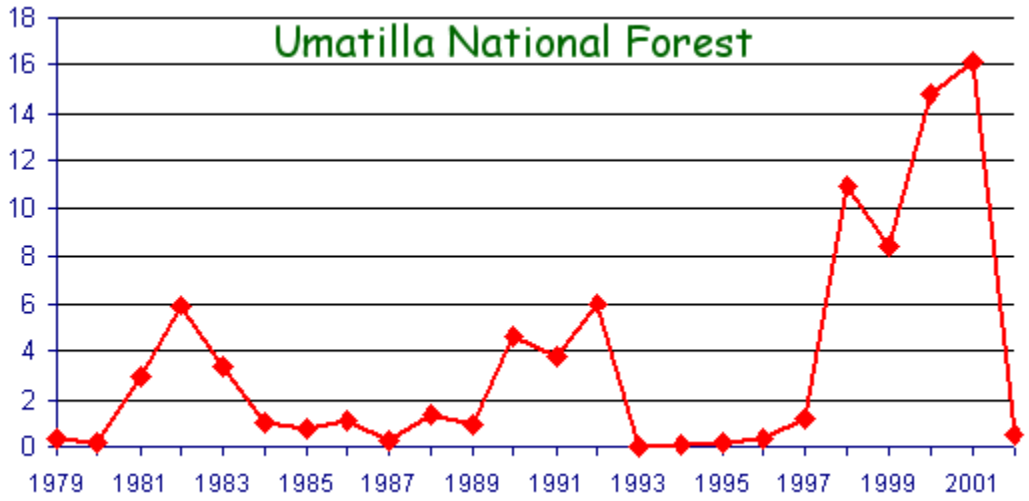


Figure 3-8. Douglas-fir Tussock Moth Pheromone trap data, Washington and Oregon, 1979 - 2002

Large populations of western spruce budworm were in the area last in the late 1980s and early 1990s. Increasing levels of budworm were found this fall (2004) in Central Oregon.

Root Rots

Root rots are also active agents of mortality in stands in the planning area. The dominance of grand fir and Douglas-fir in many stands makes them susceptible to several types of root rot disease. Western larch and ponderosa pine tend to be more resistant to root rots than true firs and Douglas-fir.

Table 3-29. Root Disease Hazard Rating in the Lower Sheep Planning Area

Root Disease Hazard Rating	Acres of Forest Land	% of Acres
High	14,995	57%
Medium	7,267	28%
Low	4,082	15%

Douglas-fir Beetle

Almost three-quarters of the area is moderately to highly susceptible to mortality from Douglas-fir beetle (*Dendroctonus pseudotsugae*). Douglas-fir beetles normally breed in weakened or down hosts. In certain instances when down or weakened host material is particularly abundant, beetle populations can build to high levels and nearby standing hosts may be attacked and killed. Outbreaks are sporadic and usually of short duration, subsiding after 2 or 3 years. Since Douglas-fir beetles strongly prefer the largest trees in a stand, even short-duration outbreaks can have significant effects on stand structure and gap formation (USDA FS, SW Oregon FHP Service Center).

Table 3-30. Douglas-fir Beetle Hazard Rating in the Lower Sheep Planning Area

DF Beetle Hazard Rating	Acres of Forest Land	% of Acres
High	2,794	11%
Medium	16,146	61%
Low or None	7,405	28%

Fir Engraver

Fir engraver (*Scolytus ventralis)*, a bark beetle that attacks primarily grand fir, and rarely Douglas-fir, Engelmann spruce, or western larch, is currently active in many stands in the Blue Mountains. Tree mortality from fir engraver tends to be scattered through stands, with a few trees per acre killed each year. The dominance of grand fir in many stands makes them susceptible to fir engraver. The following map shows the occurrence of dead grand fir that died in 2004, as mapped from an airplane in fall of 2004 over the Lower Sheep planning area (red patches on the map). There are a few patches where 30 to 50 dead trees were seen. In most of the patches, 0.25 to 5 dead trees per acre were mapped.

Fir engravers are a secondary pest, meaning that they cannot successfully attack and kill healthy vigorous trees (in contrast to other bark beetles such as Douglas-fir, mountain pine and western pine beetles). They prey upon weakened, dying, or recently killed fir trees, and are well-adapted to finding this normally scattered food source. Certain agents of stress have been shown to predispose firs to engraver attack. These include drought; overstocking, especially if a high percentage of the stand is true fir; root disease, particularly Annosus root disease; defoliation, particularly by Douglas-fir tussock moth; and the presence of abundant dead material such as slash and windthrow nearby. Therefore, minimizing stand stresses to keep trees healthy and vigorous is the only real option for control (Dekker-Robertson et al 2004).

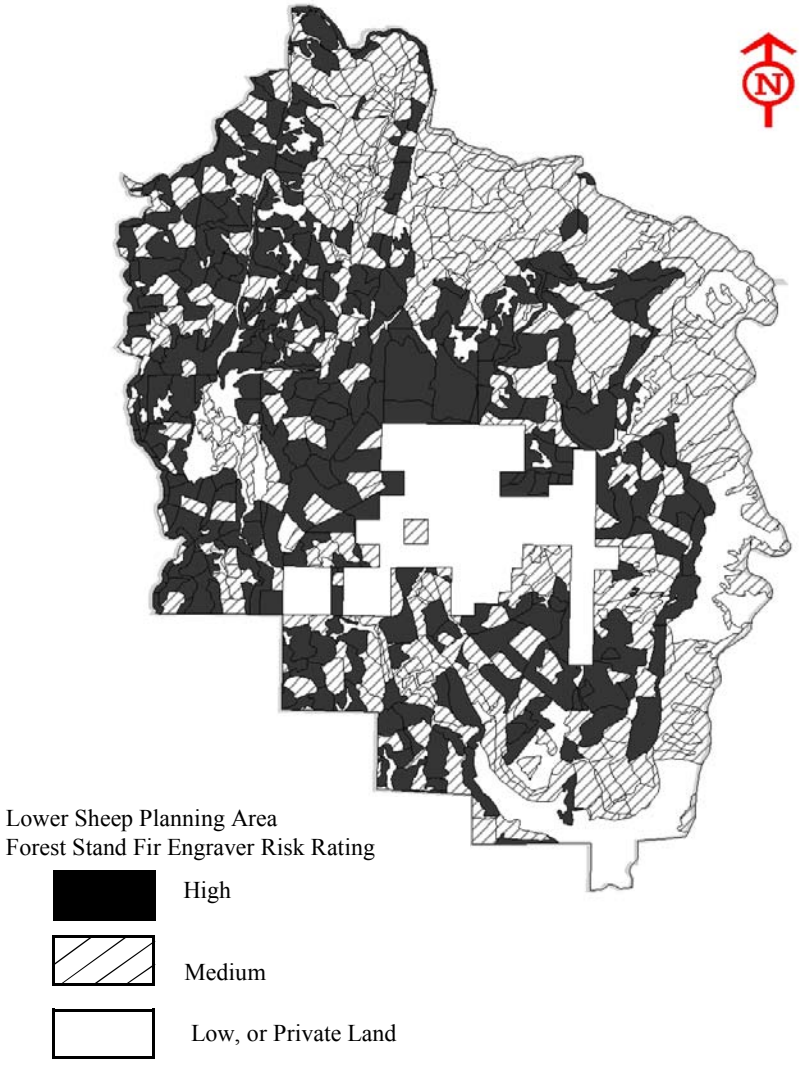


Figure 3-9. Forest Stand Fir Engraver Risk Rating

Dwarf Mistletoe

Dwarf mistletoe in western larch *(Arceuthobium laricis)* has caused moderate levels of mortality in many stands. The remaining live infected trees are a source of infection to nearby larch trees, especially those in the understory. It is desired to increase the amount of larch on the landscape as it is relatively fire, disease, and insect resistant compared to late seral trees on these sites. The loss of larch in these stands results in more stands dominated by grand fir and Douglas-fir.

Table 3-31. Western Larch Dwarf Mistletoe Hazard Rating

WL Dwarf Mistletoe Hazard Rating	Acres of Forest Land	% of Acres
High	924	4%
Medium	17,652	74%
Low or None	5,324	22%

Threatened, Endangered, and Sensitive Plant Species

The planning area was surveyed as part of the following six plant surveys: Timothy P.A., 1991; Fry, 1993; Jarboe-Brock, 1994; 49er, 1995; Lower Little Lookingglass, 1996; Upper Jarboe, 2000. Areas not covered by these surveys were surveyed in 2004.

Botrychium lanceolatum, Botrychium minganense, and Botrychium pinnatum; listed on the May 1999 Regional Forester's sensitive list; were found within several harvest units of the original Proposed Action. These harvest units were not included in the Modified Proposed Action or any of the analyzed alternatives.

Leptodactylon pungens ssp. hazeline (prickly phlox) is a dry site species ranked most rare in Oregon State and is a Federal Species of Concern. One population is located in Fuel Reduction Area 8 in a rocky cliff. There is little fuel to carry a fire. Prescribed fire would not have an impact on the phlox.

Carex backii (Back's sedge) occurs on a small tributary just above the confluence with the Grande Ronde within Fuel Reduction Area 8. It is likely adapted to late season ground fires, although a hot fire could kill them. A low intensity fall burn would not contribute towards a federal listing or cause loss of viability to the species.

Silene spaldingii is Federally Listed as Threatened. It is known to occur on the Umatilla and Wallowa-Whitman National Forests. It occurs in open grasslands with deep Palousian soils. No suitable habitat was identified during the course of sensitive plant surveys.

Non-vascular species. Pre-field assessments, combined with field observations during vascular plant surveys, indicate that no potential habitat exists for rare non-vascular plant species.

Communities

Local county populations likely to use the resources or be impacted by management activities within the planning area include Union, Umatilla, and Wallowa counties in Oregon, and Walla Walla County in Washington. People from outside the counties visit the National Forest but most never leave the main highways. The major users of the area would be locals, gathering personal use firewood or post and poles, hunting, or berry or mushroom gathering, or other disperse use. During hunting season most users come from outside the local communities. Some demographics and trends for these counties are found in US Census Bureau reports and summarized below.

Table 3-32. US Census Bureau Reports

County	2000 Population	Percent Growth since 1990	State Growth since 1990	Percent Minority Population	Largest Minority group
Union	24,530	4	20.4	6.9	Hispanic
Umatilla	70,548	19	20.4	22.5	Hispanic
Wallowa	7,226	5	20.4	4.3	Hispanic
Walla Walla	55,180	14	21.1	21.2	Hispanic

The following table shows some selected business patterns for the counties, also based on the US Census Bureau information from 1996.

Table 3-33. 1996 US Census Bureau Report

County	Total Number of Workers	Agricultural % of Workforce	Construction % of Workforce	Lumber and Wood Products % Workforce	Lumber and wood Products % of annual Payroll	Transportation % of Workforce	Wholesale Trade % of Workforce	Retail Trade % of Workforce	Retail Trade % of Annual Payroll	Services % of workforce	Services % of annual payroll
Union	6,834	< 2	4	15	35	4	6	33	20	27	23
Umatilla	17,480	< 2	5	4	7	5	7	26	17	28	24
Wallowa	1,460	< 2	11	12	23	4	< 5	28	23	31	26
Walla Walla	16,520	< 2	4	6	8	4	5	22	13	46	38

Walla Walla and Umatilla counties are not timber dependent communities. Union and Wallowa counties appear to be timber dependent based on the percent of employment and or the percent of the total annual payroll for lumber and wood products. Lumber and wood products jobs appear to provide the higher wages based on the percent of the workforce employed and the percent of the total annual payroll.

Glasmeier and Wood noted, "The input-output analysis of Wallowa County has revealed the County's continued dependence on natural resources, particularly rangelands used for cattle as well as the forests in the County. Cattle and timber-related industries are clearly Wallowa's economic base, as a large percentage of the commodities produced by these sectors are exported from the county. The forestry sector is a major contributor to Wallowa's economy through the exporting of timber as well as through its relationship to the mills located in the county. It is clear that there could be more extensive linkages between the timber industry and related manufacturing sectors within the county, especially considering the vast tracts of forest resources in Wallowa and the amount of timber that is typically harvested from the area. Furthermore, timber-related manufacturing industries are high value added industries and can have an inordinately strong, positive effect upon a local economy. It is of note, however, that the recent trend within the county has been for timber-related industries, particularly mills, to close. …"[6]

Findings from *Forest Management in the Blue Mountains: Public Perspectives on Prescribed Fire and Mechanical Thinning*:

A survey has conducted by the Blue Mountains Institute about the Blue Mountain communities' perspectives on the use of fire and mechanical thinning to restore forest health in the Blue Mountains. Most residents have traveled extensively in the Blue Mountains and pay attention to forest issues; 84 percent were at least moderately informed about forest conditions. The majority rated Forest conditions as unhealthy based on personal observations. Findings include:

[6] *Socioeconomic Analysis and Economic Base Assessment of Wallowa County, Oregon;* Lawrence E. Wood, Research Assistant; Amy K. Glasmeier, Ph.D., Professor of Geography and Regional Planning; Department of Geography,

The Pennsylvania State University; August 2001.

- Prescribed fire is generally a useful, safe, and an acceptable practice. Local forest users are willing to live with the resulting short-term impacts on soils, wildlife habitat, water quality, recreation, and scenic views. The study showed 84 percent support of a management policy of prescribed fire over not using prescribed fire.
- Most people agree that mechanized thinning is an effective tool for minimizing insect and disease damage to the forests. Overall, 93 percent support a policy of mechanical thinning for reducing forest disease and infestation over not using the practice.
- In ranking treatment, 76 percent preferred selective thinning over using prescribed fire (16 percent), with 8 percent opting for no program, preferring instead to let nature take its course.

The Treaty with the Walla Walla, Cayuse, Nez Perce, 1855, ceded this area to the United States government. Traditional uses that still occur in the area include gathering and hunting.

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 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 lands that may affect tribal rights.

Locally, the planning area lies within the area ceded to the United States government by the Confederated Tribes of the Umatilla Indians (CTUIR), as a result of the Treaty of 1855. As a result of the treaty, elements of Indian 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 facilitate the execution of treaty rights and traditional cultural practices of the CTUIR Indians by working with them on a government to government basis and in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the tribe or the federal government. Because tribal trust activities often occur in common with the public, the Umatilla National Forest strives to manage ceded lands in favor of the concerns of the CTUIR Indians, as far as practicable, while still providing goods and service to all people.

Specific treaty rights applicable to that land base managed by the Umatilla National Forest are generally articulated in Article I of the CTUIR Treaty of 1855, and include:

> "The exclusive right of taking fish in all the streams running through or boarding said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Although the 1855 Treaty does 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.

The CTUIR and Nez Perce were sent letters inviting them to provide comments: neither tribe has provided comments.

Timber

One-third of the area has been entered for harvest at least once already, and approximately one-tenth of the area has been entered for harvest more than once.

Table 3-34. Previous Harvest Entries on Stands on the Lower Sheep Planning Area

Number of Harvest Entries	Acres
Zero	17,583
One	6,107
Two	2,185
Three	443
Four	27

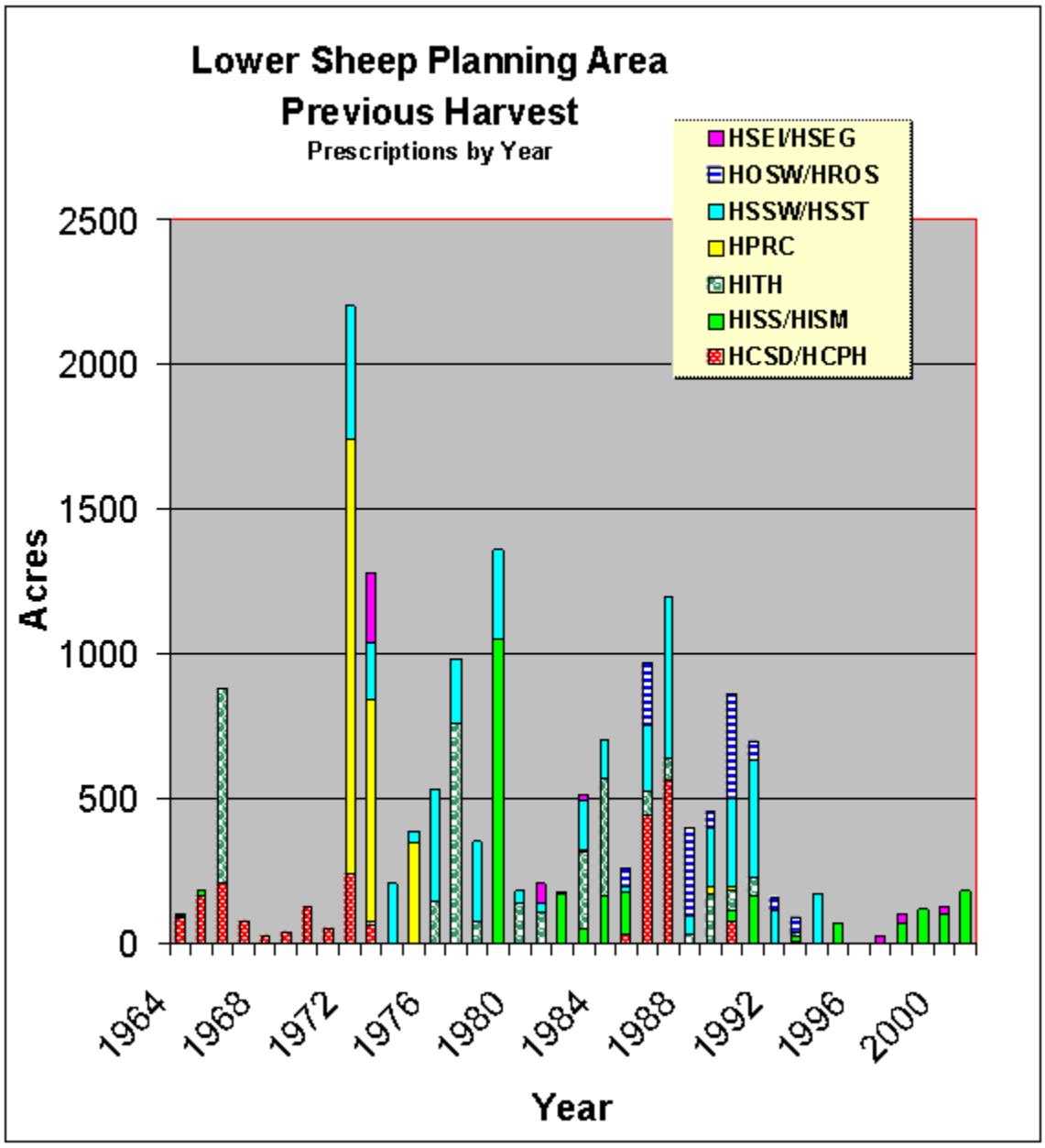
The effect of the regeneration harvest entries on today's landscape has been to make the remaining stands less continuous. Intermediate harvest has reduced tree density and canopy closure in some stands, which has encouraged understory growth of conifers, shrubs, grasses, and forbs. To the extent that slash treatments were carried out, additional fuel reduction occurred.

Table 3-35. Previous Harvest Prescriptions on Stands on the Lower Sheep Planning Area

Type of Harvest	Prescription	Abbreviation	Acres
Stand Regeneration Harvest	Stand Clearcut or Patch Clearcut	HCSD/HCPH	2,159
	Shelterwood Seed Cut or Seed Tree Cut	HSSW/HSST	4,537
	Overstory Removal	HOSW/HROS	1,160
Intermediate Harvest	Sanitation or Mortality Salvage	HISS/HISM	2,349
	Thinning	HITH	3,078
	Partial Cut	HPRC	2,652
Uneven-aged Harvest	Individual Tree or Group Selection	HSEI/HSEG	419

The following chart shows the number of acres harvested by year by prescription. The emphasis on salvage (HISM and HISS) follows years of tussock moth and spruce budworm epidemics, which have been followed by tree mortality caused by bark beetles. Clearcutting was common before 1975, and there was some in the early 1990s.

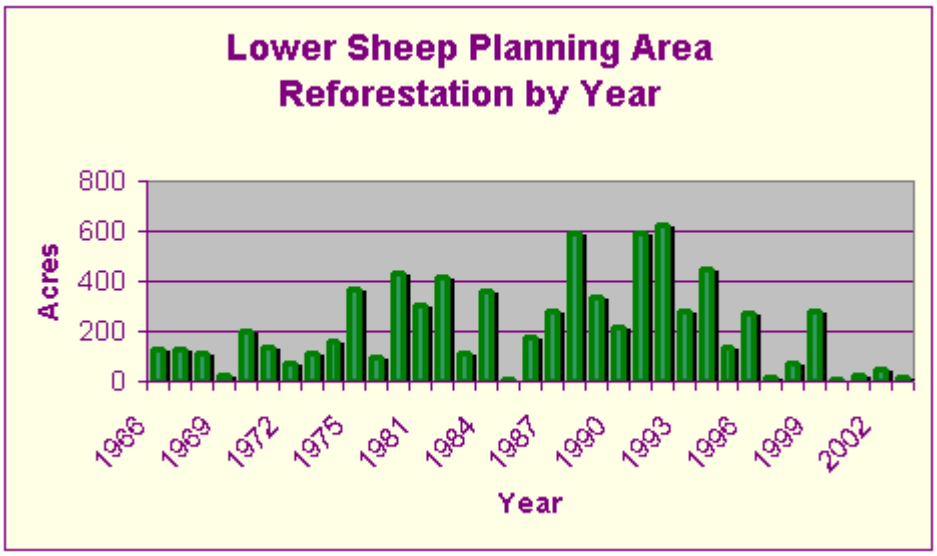
Figure 3-10. Previous Harvest Prescriptions by Year



HSEI/HSEG = Individual Tree or Group Selection; HOSW/HROS = Overstory Removal
HSSW/HSST = Shelterwood Seed Cut or Seed Tree Cut; HPRC = Partial Cut
HITH = Thinning; HISS/HISM = Sanitation or Mortality Salvage
HCSD/HCPH = Stand Clearcut or Patch Clearcut

7,591 acres have been artificially reforested through planting of harvest units.

Figure 3-11. Reforestation Planting on the Lower Sheep Planning Area



Chapter 4 – Environmental Consequences

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Chapter 4 - Environmental Consequences

Introduction

This chapter discloses the potential effects of implementing each alternative described in Chapter II. Impacts to resources of concern raised during scoping and the comment period will be tracked under the single resource that generated it. A detailed description of the affected environment can be found in Chapter III.

Effects can be direct (occurring at the same time and place as the action), indirect (separate in time from the action that caused them), or cumulative (the incremental effect of the project when added to the effects from other past, present, and reasonably foreseeable actions). In most cases the description of the existing condition is a cumulative effect of past and present actions as with HEI, cover, existing lynx habitat, or watershed condition. The analysis of direct effects looks at the changes to the existing condition to determine impacts to the resources of concern, what management requirements are needed, or if Forest Plan standards and guidelines are met. Effects are described in terms of increases, intensity, duration, and timing. This chapter provides the analytical background for the comparison of alternatives described in Chapter II.

Fire and Fuels

The Forest Plan states the following Goal; "*To Provide and execute a fire protection and fire use program that is cost efficient and responsive to land and resource management goals and objectives. Forest Plan Pages 4-87 and 4-88. Resource goals and objectives include:*

Increasing stand resilience to naturally occurring fires.

- *Use fire disturbance in shaping forest cover to reflect structure and fire intensity associated with historical forest types.*
- *Use landscape fire in areas seral to ponderosa pine to reduce hazardous fuels and excess crown cover to emphasize a regime of low intensity surface fire.*
- *Restore the diversity of vegetation patterns reflective of historical disturbance processes and with a low risk to epidemic insect outbreaks."*

Comparison of Alternatives:

Table 4-1. Acres Proposed for Treatment by Fire Regime and Condition Class

	Harvest Units				Fuel Treatment Areas				
Alternative	Fire Regime	CC 1	CC 2	CC 3	Fire Regime	CC 1	CC 2	CC 3	Total Acres Treated
A		0	0	0		0	0	0	0
B	Frequent	22	35		Frequent	347	1,774	98	2,276
	Mixed	1,441	127	147	Mixed	415	49	82	2,261
	Infrequent		40		Infrequent	39			79
Total Acres		1,463	202	147		801	1,823	180	4,616
C	Frequent	22	35		Frequent	347	1,774	98	2,276
	Mixed	1,015	65	31	Mixed	415	49	82	1,657
	Infrequent		40		Infrequent	39			79
Total Acres		1,037	140	31		801	1,823	180	4,012

	Harvest Units				Fuel Treatment Areas				
Alternative	Fire Regime	CC 1	CC 2	CC 3	Fire Regime	CC 1	CC 2	CC 3	Total Acres Treated
D	Frequent		32		Frequent	347	1,774	98	2,251
	Mixed	877	53	88	Mixed	415	49	82	1,564
	Infrequent		40		Infrequent	39			79
Total Acres		877	125	88		801	1,823	180	3,894
E	Frequent	0	32		Frequent	347	1,774	98	2,251
	Mixed	909	53	74	Mixed	415	49	82	1,582
	Infrequent		40		Infrequent	39			79
Total Acres		909	125	74		801	1,823	180	3,912

Table 4-2. Proposed Treatments by Fuel Model

	Harvest Treatments						Fuel Treatment Areas					
Alt	FM 1	FM 2	FM 5	FM 8	FM 9	FM 10	FM 1	FM 2	FM 5	FM 8	FM 9	FM 10
A												
B	0	676	13	877	99	147	0	651	1190	642	207	114
C	0	480	10	588	99	31	0	651	1190	642	207	114
D	0	559	11	358	75	87	0	651	1190	642	207	114
E	0	519	11	430	75	73	0	651	1190	642	207	114

Effects are summarized from input provided by the Fuels Specialist found in the *Fuels report for the Lower Sheep Timber Sale and Fire Reintroduction Project* with supplemental information in the EA.

Alternative A - No Action

Direct, Indirect and Cumulative Effects

Successional processes would continue increasing biomass through time as forest stands become increasingly homogeneous in composition, structure, and fuel loads. Fuel loads and structure would become more complex shifting stands from the current fuel models that generally have low intensity wildland fires to a fuel model characterized with high intensity fires. As shade tolerant tree species become more numerous in the understory, ladder fuel conditions would develop. The landscape would become at higher risk to catastrophic wildland fire events as the percentages of condition class 2 and 3 and Fuel Models 2 and 10 increases.

The increased fire intensity lowers the probability of successful initial attack efforts and increases ember loft associated with the spotting distance. Modeled fire behavior shows spotting distances a half mile from the fire's edge. Prevailing southwest winds would combine with local diurnal flows to push the fire northeast and east. Private lands to the north and west of the Grande Ronde Canyon rim would be threatened by fire coming out of the canyon. When fuels are dry, wildfires would change in intensity causing fires with greater than 5-foot flame lengths. Successful initial attacks would lessen and there would be higher risk to firefighter safety. The cost of firefighting would go up because hand crews would need assistance from aircraft and more firefighters would be needed when the event became large.

Stands that are characterized as condition class 2 and 3 are mainly located within and along the rim of the Grande Ronde Canyon. A summer wildland fire would burn with higher intensity along the rim. Historically these slopes would burn with low intensity fires but with the continued buildup of fuel complexity the fire behavior along the rim is changing and stands that would have been resilient to

surface fires are becoming at risk for catastrophic events. Private lands along the rim country will also be at risk for catastrophic damage from a fire moving out of the canyon.

The existing mosaic of grasslands, timberlands and steep ground within the Grande Ronde canyon would not provide for firefighter safety or control the extent of wildfire on the landscape. The grassy portions of the canyons provide areas were wildfire would spread rapidly. Fire in light fuel, such as grass, is one of the common denominators in fire entrapments. There is usually very little ecosystem damage from a grass fire because of the rapid passage of the flaming front. However, this rapid passage can deliver fire to a wide area of heavier fuels along the grassland's edge setting the stage for a mass ignition of adjacent timber stringers that otherwise would burn much slower than the grass. Mass or multiple ignitions in heavy timber greatly increases the likelihood of crown fire and would require the assistance of aerial suppression measures along the rim. A timber fire confined by the drainages creates a chimney that pretreats or dries the fuels above prior to the arrival of the fire and creates its own winds and weather at the head of the drainage. Potential fire intensity at the top of the drainage, at the rim, can be very severe and is a high risk area to firefighters; it has been the cause of death in other wildfires. Even though there are roads along the rim and the stands are mainly ponderosa pine with grass understory, hand crews would find it difficult to take suppression actions. The ponderosa pine stands have a dense understory and 7-foot flame lengths are expected. The roads are narrow, 12-foot wide, and many of them are designated closed in the access and travel management plan having brush, limbs, and small trees encroaching or closing the travel way. These are not good holding lines and would not be safe places to place a crew when a fire comes out of the canyon. Any crown fire coming out of the canyon would likely reach the rim and run out the bench beyond the rim. Aerial attack would be the primary suppression measure with secondary line constructed and reinforced with backfires as an indirect suppression method. Fire suppression efforts and success will be variable depending on fuel moisture and weather conditions at the time of a fire start.

When a fire comes out of the Grande Ronde Canyon and moves into the uplands beyond the rim the rate of spread would decrease due to less steepness of slope and somewhat cooler conditions. Fire intensity would be expected to increase due to the heavier surface fuel loadings and an increased ladder fuel component. The intensity would be beyond that which a firefighter can attack from the ground alone. The lower rate of spread would allow the use of indirect methods of control using previous harvest units or roads as anchor points for control. Fuel treatments in the previously harvested units give conditions with a low rate of spread and fire intensity; places firefighters can use to begin suppression actions or use to reduce the intensity of a flaming head. The mosaic of past harvest units can be used to contain the size of a wildfire under normal or average weather conditions.

Effects Common to all Action Alternatives

There are two focuses for the fuel reduction proposed in the Lower Sheep Planning Area. One focus is to restore fuels to the character found in the frequent fire regime within and along the rim of the Grande Ronde Canyon. The other is to maintain conditions of low intensity wildfire, as defined by Fuel Model 8, after vegetation treatments to maintain forest health, vigor, and resilience. Fire plays a role in both of these because it can be used to maintain early seral tree species and reduce fuels. The primary focus in the Grande Ronde Canyon is to restore the frequent fire regime of grasslands and dry forest using prescribed fire. Between the rim of the canyon and the private lands the maintenance of fuel conditions and stand structure that maintain lower intensity wildfires is important for ease of fire suppression and the protection of the private lands. Other treatments with a focus on maintaining early seral tree species and maintaining stand vigor would use fuel treatments to maintain low potential fire intensity to aid in controlling the size of potential wildfires. By focusing harvest treatments to the understory, the height to crown would be increased and the use of various fuel treatments becomes effective. Stand composition and expected mortality dictated whether jackpot burning, under burning, or mechanical slash mastication methods were used.

Direct and Indirect Effects

Fuel Reduction in Harvest Units: Treatments of harvest slash would occur in the fall or spring after harvest. The window of opportunity for prescribed fire can sometimes be short and the slash could remain on the ground a year or two. Within harvest units there would be a short-term increase of fine, less than three inch, and small, 3 to 9-inch, fuels lasting one to two summers, depending on when the unit was harvested, when a suitable burn window occurs, or the timing of a contract for slash mastication and how the timber sale operator is moving through the contract. Any of these factors can delay treatments and increase the length of time high fuel conditions exist on the landscape. Mastication is not dependent on a burn window or the curing of the slash so would likely receive quicker treatments; usually the season after harvest. The following table displays proposed slash treatments for harvest units. Mastication is the primary method proposed for use. This eliminates expected stand mortality that would be associated with prescribed fire and protects wildlife and stand cover values. Slash busting (mastication) would be used for slash treatment in 68 percent of the units proposed in Alternative B, 71 percent of the units in Alternative C, 73 percent of the units in Alternative D, and 78 percent of the units in Alternative E.

Table 4-3. Acres of Slash Treatments by Alternative

Alternative	Jackpot	Jackpot/slash busting	Mastication	Underburn	YUM	Total Acres
B	432	54	1,226	84	16	1,812
C	264	0	860	68	16	1,208
D	214	0	792	84		1,090
E	157	0	867	84		1,108

Harvest units would be represented by Fuel Model 11 until they are treated. Fires would be fairly active in the slash and herbaceous material. The shading from the overstory and the arrangement of the light fuels would help to reduce fire intensity. In general 3.5 foot flame lengths are expected but jackpots of heavy fuels create hazardous conditions. Even though expected flame lengths are higher than the 1 foot flame length for Fuel Model 8, ground crews can effectively take action. Fire would move faster through the stand because of the high amount of fine fuels. The rate of spread in Fuel Model 8 is 3 chains per hour and in Fuel Model 11 it is 6 chains per hour. The more rapid rate of spread would mean a larger crew would be needed to control the fire and construct firelines. Should a wildfire occur prior to treating the slash the increased fuels would increase the cost of suppressing the fire because a larger crew than our three person engine crew could be needed to successfully suppress the wildfire. There would be a cost to increased patrols during the summer on high fire risk days. After slash treatments, suppression actions can be accomplished with a smaller crew and patrols reduced. The increased fuel loads places a wildfire right on the boarder for effective ground crew suppression, but experience indicates it can be contained safely under normal weather conditions. There is no change in the ability to control a wildfire, but the rapid rate of spread and ease of ignition caused by the increase in fine fuels increases the risk of fire spreading to a larger area than a wildfire occurring in Fuel Model 8.

Of most concern to any suppression effort is the increase in small, 3 to 9-inch, and large, 9-inch plus, fuels. These fuels hinder line construction and would increase the amount of time fire remains on the landscape because large fuels take longer to burn. The amount of 3 to 9-inch fuels in the moist to infrequent and mixed fire regimes means that 5 foot flame lengths are possible. When jackpots of larger fuels are encountered by firefighters they are a problem because of high fire intensity. Isolated large fuels or concentrations of large fuels become a problem for line construction. The stands in the mixed to infrequent fire regime would have slash mechanically treated using slash busting methodologies. Treatments would likely occur the season after logging and would focus on breaking up the less than 9 inch fuels. When relying on prescribed fire to dispose of slash, the elevated fuel conditions could remain on the landscape longer than one season however this is the smallest portion of the proposed slash

treatments and could be dealt with effectively should a wildfire occur in the area because the condition would not represent a large portion of the landscape, see Table 4-3 above for acres of jackpot and underburning. The proposed mastication would also help to isolate areas proposed for prescribed fire. The expected fuel loads in the 0 to 3 inch range would not generate burn intensities that would keep ground crews from being able to take suppression actions under average weather conditions.

Table 4-4. Alternatives B, C, D and E: Expected Fuel Loading in Tons per Acre without Slash Treatment

Fuel Load/Fire Regime	0-1/4"	¼ to 1"	1 to 3"	3 to 9"	9 to 20"	20"+	Total Tons per Acre
Mixed to Infrequent	2	4	6	20	18	2	52
Mixed	2	3	4	14	5	1	29
Frequent	2	3	3	6	1	0	15

When prescribed fire is used for slash treatment, the fuel beds would exhibit fire intensities varying from a creeping ground fire to flame lengths of 1 to 2 feet. This would limit mortality to small diameter trees, mainly noncommercial size. When using prescribed fire it may take additional treatments to reach the desired fuel load conditions because of mortality to small diameter trees, particularly when underburning is used. Any additional burning would require its own analysis to account for changes in project design and the most current information. Underburning would occur on 68 to 84 acres depending on alternative and jackpot burning is proposed on 460 acres with Alternative B, 264 acres with Alternative C, 214 acres of Alternative D, and 157 acres of Alternative E. Impacts associated with jackpot burning would be confined to the area of jackpots because fire would not broadcast to the whole unit. Untreated jackpot fuels do not contain as much risk to suppression efforts because the fuels are concentrated in a mosaic and lack continuity for carrying a fire.

Table 4-5. Alternatives B, C, D, and E: Expected Fuel Loading in Tons per Acre after Slash is Burned

Fuel Load/Fire Regime	0 to ¼"	¼ to 1"	1 to 3"	3 to 9"	9 to 20"	20"+	Total Tons per Acre
Mixed to Infrequent (III, V)	0	0	4	8	11	1	24
Mixed (III)	0	0	2	9	2	1	14
Frequent (I)	0	0	1	5	1	0	7

Slash treated mechanically by mastication leaves chips in place of the original limbs and branches. These fuels would contribute to burn intensity while they are lofted and air can circulate through the chips. After several years and winter compaction, these fuels would play a lesser role as they begin to decompose and act like mulch. Personal observations by the fuels specialist noted that masticated fuels compact after two to three winters and would exhibit fire behaviors much like Fuel Model 8. Even in their fresh state, the chips would not contribute to flame lengths above 3 feet and would likely smolder due to lack of air circulation and the retention of fuel and soil moisture. Wildfires would have a low rate of spread and low risk of moving into the crowns. The mosaic of regeneration left for forage base and cover in lynx habitat would be protected. There would be improvement in the ability to successfully

suppress wildfire both in the area around the private lands and where actions are being taken to improve forest health, vigor, and early seral tree species. This improved condition is expected to last 35 to 50 years.

Reduction of Risk to Crown Fire: Timber harvest would remove trees that occupy low to intermediate canopy positions in stands dominated by commercial size timber; the layer that contributes to ladder fuel conditions. A combination of silvicultural and activity fuel treatments would be used to increase the crown base height by removing the intermediate canopy, allowing a portion of sapling to pole size trees to remain for other resource values. The follow-up activity fuels treatments would reduce fire intensity and flame lengths lowering the risk for a fire to move into the crowns. Mortality from a crown fire would decrease by almost 70 percent throughout the planning area. Estimates were determined by using the Fuel Manager Analyst model, Release 1.0.18. Under wildfire conditions the crown fraction burned would be reduced from 79 percent to 30 percent. Flame lengths would also be reduced from 5.3 feet to 1.6 feet.

Fuel Reduction in Fuel Treatment Areas 4, 6 and 8: Approximately 2,800 acres within the Grande Ronde River Canyon and along the rim would receive only prescribed fire treatments causing an accelerated cycle of fuel accumulation. Eighty percent of the stands exhibit condition class 2 meaning that prescribed fire would have a large amount of biomass to remove in order to restore historic character of the frequent fire regime. Trees and brush killed by the prescribed fire would deteriorate within 3 to 5 years, adding branch and limbwood to litter on the forest floor. After 8 to 10 years, most small diameter boles would have fallen, contributing to fuel loads in the 3 to 9 inch size class. Subsequent fuel treatments would be necessary on 5 to 8 year intervals in order to maintain the desired level of fire protection and to continue restoring the landscape to the character maintained by frequent fires.

Prescribed fire would be used to reduce existing fuel loadings and manipulate vegetation structure and composition. Ignition methods would be employed which best suit historical patterns of disturbance. In the Frequent Fire Regime and lighter fuel loadings in the Mixed Fire Regime, ignition would be in a strip-head or backing fire pattern. Areas with heavier fuel loadings would be ignited in a spot pattern in order to break up fuel concentrations by introducing a "patch" effect. Burning prescriptions would be implemented to remove the 0 to 9-inch size classes of fuel, while conserving the greatest portion of 9-inch and larger sized fuel. Fuel consumption estimates are based on predictive modeling using First Order Fire Effects Model (FOFEM) Version 5. Table 4-6 exhibits the average expected post burn fuel loading by Fire Regime in blackened areas.

Table 4-6. Natural Fuels Post Underburn Expected Fuel Loading in Tons per Acre

Fuel Load/Fire Regime	0 to ¼”	¼” to 1”	1 to 3”	3+”	Total Tons/Ac
Mixed/Infrequent (III, V)	0	0	0	16	16
Mixed (III)	0	0	0	12	12
Frequent (I)	0	0	.10	5	5

Stand Mortality from prescribed fire: Fuel moistures, fuel availability and intensity of ignition determine the magnitude of fire effects for a given area. Summer ignitions will have lower fuel moistures therefore greater fuel availability. Summer condition ignitions would burn a significantly wider area than a spring or fall scenario.

Lighting techniques also influence the extent of the burn. Underburns utilizing strip-firing techniques quite often burn with greater severity and extent due to the abundance of heat produced. Spot firing techniques or backing fires produce lower levels of heat, and so generally would foster less severe effects.

It should be noted that fuel moisture is a primary player in developing fire intensity and severity. Expected mortality in underburn units is displayed in the following table. Under prescribed fire burning conditions it is unusual for more than 60 percent of the defined ignition unit to be blackened. This small-

scale mosaic or patchiness is due in a large part to the discontinuous nature of the fine fuels that carry fire. Expected tree mortality under prescribed fire conditions is displayed in Table 4-7.

Table 4-7. Percent Probability of Expected Mortality (2-4 Ft Flame Length)

Species	Tree DBH	% Expected Mortality from Prescribed Fire
Grand fir	8	68
	12	32
	18	17
	22	11
	28	7
Western larch	8	36
	12	20
	18	9
	22	6
	28	4
Ponderosa pine	8	36
	12	20
	18	9
	22	6
	28	4
Douglas fir	8	36
	12	20
	18	9
	22	6
	28	4
Engelmann spruce	All Size Classes	80

Fire effects on grass and shrub species vary by timing and intensity of the burn. Perennial and annual grasses are often favored by fire when it occurs in the post-growing season. Burns occurring shortly after new growth has begun can inhibit and sometimes eliminate some species (GTR WO-16, March 1981). Regeneration is by reseeding or rhizomatous resprouting.

Lack of fire disturbance has resulted in an accumulation of litter and duff around the base of large diameter ponderosa pine and other tree species. Studies and anecdotal evidence has shown that long duration smoldering in this duff mound may adversely affect large pines, and in some cases inflict mortality. Generally, summer/fall burns produce less adverse effects than spring burns. (Agee, August 1990) Discussions with operational specialists around the tri-forest area (Wallowa-Whitman, Umatilla, Malheur) suggests that mortality has occurred, but at levels acceptable to resource objectives, and that most desirable results are achieved when burning occurs at the post-growing stage. (Correspondence with V. Rockwell, R. Baumann, D. Becker)

Fuel Changes to Increase Successful Suppression Efforts and Fire Fighter Safety: Based on intensity, Fuel Models 2, 5, and 10 are important to receive treatments that lower fire intensity. Fuel Model 2, pine with grass type, would burn with 7 foot flame lengths and is the dominate fuel type above the canyon rim. Many of these stands are actually western larch that are expected to behave like the pine with grass type due to understory fuel conditions. Fuel Model 5 has 6.5 foot flame lengths and Fuel Model 10, 5.7 foot flame lengths. Fuel Model 9 has flame lengths of 3 feet with a rate of spread of 11 chains per hour. The proposed treatments would move more of the area towards the character of Fuel Model 8 with 1 foot flame lengths and 3 chains per hour for a rate of spread, a fire easily handled by a three to four person crew. Timber harvest, hand piling of fuels and burning the piles, mechanical mastication of fuels, and

prescribed fire would be utilized to maintain or increase Fuel Model 8 conditions on the landscape. Fuel Model 8 offers the best fuel conditions for firefighter safety and successful suppression with small ground crews.

Table 4-8. Amount of treatment by Fuel Model with Harvest and Landscape Prescribed Fire

		Alternative B		Alternative C		Alternative D		Alternative E	
Fuel Model	Total Acres of Fuel Model	Total Fuel Model Treated	Percent of Fuel Model Treated	Total Fuel Model Treated	Percent of Fuel Model Treated	Total Fuel Model Treated	Percent of Fuel Model Treated	Total Fuel Model Treated	Percent of Fuel Model Treated
2	8,757	1,327	15	1,131	13	1,210	14	1,170	13
5	4,860	1,403	29	1,200	25	1,191	24	1,191	25
9	1,339	306	23	306	23	282	21	282	21
10	3,465	261	8	145	4	201	6	187	5
High Risk Acres	18,421	3,297	18	2,782	15	2,884	16	2,830	15
8	6,807	1,519	22	1,230	18	1,000	15	1,072	16

All harvest prescriptions, except group selections, would contribute to changing fuel conditions making fire suppression efforts more successful. Group selections would remove up to 20 percent of a unit using patch cuts less than 2 acres in size leaving areas between the groups untreated. The group or patches are not large enough to offer safety zones nor big enough for anchor points to begin suppression. The group selections are located where dead wood or diseased trees are highest so when slash is treated fuels loads are reduced but the stand wide effect would essentially not change the fuel model. When group selections are located in Fuel Model 8 they help to maintain low fuel loads. Alternative B has approximately 26 acres of the group selection units in Fuel Model 8; Alternative C has no acres; Alternative D has no acres; and Alternative E has 26 acres. The 26 acres treated using group selections in Alternatives B and E is in Unit 79 and is adjacent to the interior private lands. Locating the groups in areas of highest fuel concentrations and disease would reduce flare-ups in jackpots of fuels.

Table 4-9. Acres Maintained or Converted to Fuel Model 8 using Harvest

Alternative	Total Acres Harvested	High Risk Acres becoming Fuel Model 8	Acres Maintained as Fuel Model 8	High Risk Fuels Treated without change
B	1,812	831	877	104
C	1,208	603	588	17
D	1,090	732	358	
E	1,108	678	430	

Protection of Private Property: All alternatives have a focus for harvest treatments around the private lands; approximately 67 percent of Alternative B is within a half mile of private lands, 66 percent of Alternative C, 84 percent of Alternative D, and 93 percent of Alternative E. The units have been located to block up and maintain areas of Fuel Model 8 to break up the fuel continuity on the landscape above the rim to the canyon. The proposed landscape prescribed fire treatment along the rim and into the canyon is common to all alternatives and would work towards keeping fire on the ground and reduce intensities of a fire coming out of the Canyon. It would take several prescribed fire entries in the canyon to accomplish fuel goals and landscape condition.

The proposed harvest units between the rim and the private lands are located in areas that would expand the amount of Fuel Model 8 conditions to aid in suppression by increasing the width of low fuel

conditions on the landscape. They anchor into natural wet meadows to help reduce the rate of spread along the private boundary. They provide an area within a half mile of the boundary that would allow for suppression actions were crown fires would be at lower risk and spot fires are less likely to get large or move fast.

The difference between the alternatives is the amount of acres proposed for treatment around the private property with Alternative B treating the most acres. There would be fewer miles of private boundary treated than Alternative B, see Table 4-10. There would be fewer acres of high risk fuel models treated and Fuel Model 8 maintained. Alternates C, D, and E would treat fewer high risk acres than Alternative B; Alternative C treats approximately 190 acres less, all of it to the north of the private lands and Alternatives D and E treat 55 acres less also to the north of the private lands. A wildfire coming out of the Meadow Creek portion of the Grande Ronde Canyon would be very severe and run into this untreated area increasing the risk to catastrophic damage to both National Forest System Lands and private lands. There would also be fewer acres maintained in Fuel Model 8 than Alternative B; Alternative C treats approximately 225 acres less, Alternative D treats 240 acres less, and Alternative E treats 130 acres less; all are between the canyon rim and the private lands. The reduction in acres does not maintain blocks of land in low fuel condition causing the area to be not as efficient for taking suppression actions.

Table 4-10. Reduction of wildfire severity along private land boundaries.

Indicator of Response	Alt A	Alt B	Alt C	Alt D	Alt E
Acres treated within half mile of private land.	0	1,206	802	913	1,025
Percent of Total Harvest within a half mile of the private lands.		67	66	84	93
Miles of private land boundary treated	0	5.05	4.55	4.0	5.05
Total Acres treated supporting Private Lands Protection	0	1,289	878	996	1,108
Total Acres of High Risk Model Fuel Treated	0	734	546	680	680
Total Acres of Fuel Model 8 maintained		555	332	316	428

Using multiple fuel treatment Types: A finding of the Interior Columbia Basin Ecosystem Management Project for *The Effects of Thinning and Similar Stand Treatments on Fire Behavior in Western Forests* Graham et al 1999, PNW-GTR-463 concluded "The best general approach to managing wildfire damage seems to be managing tree density and species composition with well designed silvicultural systems at a landscape scale that includes a mix of thinning, surface fuel treatments, and prescribed fire with proactive treatment in areas with high risk to wildfire." The action alternatives are responsive to this finding. The landscape was evaluated for fire risk using fuel models and condition class. Treatments were proposed based on stand and fuel treatment needs. A variety of harvest, hand, mastication, and prescribed fire prescriptions were developed to break up landscape fuels to control the extent and intensity of a wildfire. Landscape prescribed fire was proposed within the Grande Ronde Canyon with a mixture of hand and prescribed fire treatments along the rim. Timber harvest was proposed in stands to reduce ladder fuels or for stocking level control to increase vigor and resilience. Through time the treatments would lower the fire severity increasing the survival of larger trees on the landscape. Resilience to wildfire would be improved.

The Final Report of the *Effects of Fuels Treatment on Wildfire Severity* by the Omi et al from the Western Forest Fire Research Center at Colorado University, March 25, 2002, supports the observations and antidotal information about wildfires burning into treated areas. They compared four wildfires in frequent, low severity fire regimes that burned into treated areas that included repeated prescribed fires, single prescribed fires, debris removal, and mechanical thinning both with and without slash removal. They found a good correlation between fire severity indicators and measures of crown fire hazard to fire resistance that illustrated the importance of treating fuel profiles in their entirety. Height to live crown

had the strongest correlation to fire severity along with stand density and basal area. Crucial variables that determine a tree's resistance to fire damage were height and diameter; thinning from above, with a primary focus on removing the largest trees, would be ineffective within the context of wildfire management. There was good correlation for reducing surface fuels as well as the importance of thinning the stand for wind driven wildfires. Even with untreated slash, a thinned stand sustained less damage than untreated stands when the wildfire was driven by winds.

Omi concludes that crown fire potential cannot be ignored in protecting landscapes from damage. "While surface fire intensity is a critical factor in crown fire initiation, height to crown; the vertical continuity between the fuel strata, is equally important. Further, crown fire propagation is dependent on the abundance and horizontal continuity of canopy fuels. Treatments that reduce canopy fuels increase and decrease fire hazard simultaneously … Fuels treatment practitioners have gambled that a reduction in crown fuels outweighs any increase in surface fire hazard. Our research demonstrates that their bets have been well placed. Fuel treatment moderate extreme fire behavior within treatment areas.

The greatest contributions of fuel treatments may be the options they provide for landscape management that balances society preferences with the unavoidable recurrence of wildland fires. Where fire threatens societal values, fuels treatments can facilitate suppression by providing safe access and egress for firefighters, as well as possible counter-firing opportunities. In wildlands managed to include natural processes, fuel treatments may help restore fire to its historic regime, either by restoring fuel profiles … or by buffering the border between values-at-risk and extensively managed areas where natural ignitions are allowed to play themselves out."

The action alternatives propose a complete treatment of fuels such that both surface and vertical fuels would be reduced where needed to protect private property. In stands managed for forest health goals fuels are also treated to retain or increase the amount of stands displaying the character of Fuel Model 8 in the upper planning area. It may take several burn cycles to accomplish the fuel reduction goals. Experience and emerging research indicate that fuel treatments are effective in reducing fire severity and modifying fire behavior. Stands with reduced fuels become safer places to take action on wildfires given wind and topographic conditions.

Cumulative Effects

The primary goals of the fuel reduction portion of this project is to protect private inholdings within the project boundary by providing safe conditions for firefighters and the public and to maintain historic stand structure in the frequent fire regime found along and within the Grande Ronde Canyon. Prescribed fire would be used within the canyon and a combination of timber harvest with mechanical slash or prescribed burning treatments or hand treatments with prescribed fire would be used along the rim to the private lands. Grazing, firewood gathering, and past timber harvest on private lands are the only past, present, and reasonably foreseeable future projects that could have cumulative effects to fuels and fire suppression efforts.

Grazing has the potential to affect the maintenance of the fuels and stand structure of the frequent fire regime. Grazing reduces the fine fuels needed to carry fire (this also increases fire fighter safety because of lower intensity wildfires). Portions of a sheep allotment and cattle allotment are located in the Planning Area. The sheep allotment has been in non-use since 2001 and is not impacting fuels. Transitory range found in past harvest units provided forage. The sheep allotment does not include the Grande Ronde Canyon or the lands within a mile of the rim. The cattle allotment is still active utilizing the meadows and transitory range around the private lands, the canyon lands are too steep for cattle to use. There is no impact to fuel loads by grazing in the frequent fire regime in the canyons. Along the rim, cattle and big game would graze but not enough to maintain desired fuel conditions. Periodic burns would remain useful to keeping the stands along the rim open and rejuvenate understory grasses.

Firewood gathering along open roads would not impact fire behavior or maintain the desired fuel conditions that would aid in the protection of the private lands. The roads along the rim are seasonally open in the fall so the low amount of dead wood removal in the pine grassland type would do nothing to improve surface fuel conditions. Firewood cutting increases the amount of fine fuels while it reduces large fuels. There is not enough firewood removal in this portion of the district to affect fire behavior or create effective fuel reduction along the roads. Firewood cutting increases fine fuels which makes fire starts easier and increases the rate of spread. Fire behavior is modified by the tree canopy and would create fuel and fire behavior conditions that could still be easily managed by a hand crew under normal weather patterns. Portions of the road corridor would have jackpots of fuel similar to Fuel Model 11.

Timber harvest has occurred on the private lands over the past 5 years. Fuels are lopped and scattered causing continuity with fuels on National Forest System lands. Since the private lands were thinned, the existing condition resembles Fuel Model 11. Fire could still be suppressed with hand crews, but would be larger than a single engine crew. A separation from the higher fuel loads on adjacent National Forest System lands would be useful to reducing catastrophic damage from a fire start on the private lands. The thinning of both the National Forest System lands and the private lands improves tree vigor and increases the percentage of early seral tree species. The treated stands would have lower risk to insect and disease while creating at more resilient condition. A higher proportion of trees would be fire resistant.

Approximately 33 percent of the fire starts in the planning area are human caused fires. Historically for the District, 65 percent of the human-caused fires are from campfires. Dispersed recreation opportunities increase the risk of wildfires. During the fall the roads along the rim are open increasing the risk for an escape of a hunter camp fire. Much of the area along the rim is currently Fuel Model 2. Moist fall weather would reduce fire intensities in this fuel model and when it is dry, camp fires are not permitted. Increased patrols during the hunting season aid enforcement and checks hunter camps for abandoned campfires. The proposed fuel treatments provide escape areas for the public in areas of low fuels and fire intensity. Lands along the rim would be safer because of the low levels of surface fuels and the reduced risk to crown fires.

Air Quality

The Forest Plan states the following goal: *Maintain air quality at a level adequate for protection and use of national forest resources and meet or exceed applicable Federal and State standards and regulations.*

Alternative A - No Action

Air quality would remain unchanged. Summer wildfires have the chance of degrading air quality, mainly as it affects visibility. EPA monitoring of air quality in the communities of potential impacts indicates that particulate material did not exceed standards in 1996, a high fire year. Visibility was affected but air quality remained within standards. Increased biomass would add to emissions produced by a wildfire, see Table 4-11. Dispersion and transport of emissions would depend on the nature of the meteorological conditions.

Effects Common to All Action Alternatives

Past experience has shown that significant air quality declines are limited in scope to the general burn area and of short duration. Most significant impacts occur under strong, persistent inversions or highly stable air masses. Both phenomena are uncommon during the primary burning seasons (Mid May to June and Oct. to Nov.). All of the Walla Walla District is considered a class II airshed. Areas of potential impact from burning include the Wenaha-Tucannon Wilderness, the Grande Ronde River drainage and down-canyon communities; Troy and Asotin. These areas would be affected by smoke if a strong, nighttime inversion develops or stable air holds smoke in the area. Table 4-11 shows the amount of Total Suspended Particulates, PM2.5, and PM10 produced compared between prescribed fire and a summer wildfire.

Table 4-11. Fuel Consumed and Emissions Produced from Dry Forest

Burn Event	Tons/Acres PM2.5	Tons/Acres PM10	Tons/Acres Total PM	Percent Area Burned
Alt A Wildfire	0.26	0.30	0.49	90
Alternatives B, C, D and E				
Post Treatment Wildfire	0.11	0.13	0.21	80
Natural Fuels Treatment	0.13	0.17	0.25	60
Activity Fuels Burning	0.22	0.24	0.46	60

PM10 describes particles small enough to enter the human respiratory system. Particulate matter alone or in combination with other pollutants can constitute a health hazard. Monitoring by EPA does not indicate thresholds of health concerns are being reached during the periods of wildfires or prescribed fires. The burning of fuelwood remains below levels during winter inversions and stagnant air. Weather conditions during prescribed fire are expected to disperse particulate matter to levels that would not exceed standards in the communities of concern. Visibility would be reduced; however fall rains would clean the air.

Burning would be conducted in compliance with National Ambient Air Quality Standards and Oregon Department of Environmental Quality (ODEQ) regulations and restrictions contained in the Oregon Smoke Management Plan (ODEQ Directive 1-4-1-601). An operator's burn plan is developed prior to ignition. On site weather conditions are monitored before, during, and after an ignition. Ocular smoke observations are made throughout the ignition phase. Residual smoke is monitored for dispersion and direction. No ignitions will occur if there is air stagnation advisory in place within the northeast Oregon geographic area. No ignitions would occur if existing or forecast conditions would transport measurable smoke into down wind communities. Air quality monitoring with nephelometers is in place down wind of the planning area at Asotin in Washington and in Enterprise, La Grande, and Baker City, Oregon. These stations would monitor smoke coming from fuel treatments from private and public lands. Records from these stations indicate that cumulative effects from the smoke generated by field burning on private lands, the burning of wood for home heating, and fall prescribed fires on National Forests have not exceeded standards. This project would not be expected to mix with air in the La Grande Valley. Past burning in the Eden Bench area did not exceed air quality standards and the historic trend of not having any cumulative effects leading to a violation of air quality standards is expected to continue when combined with smoke from other local sources.

Few health effects from smoke would occur to forest users due to limited exposure. Warning signs and public notices would warn forest users of areas with active burns so they may avoid the areas. Some impacts from smoke may occur to nearby residents should strong, persistent inversions hold dense smoke close to the ground for several days. The community of Troy is 15 miles northeast of the planning area and Elgin is 12 miles south. Troy has the greatest chance of receiving smoke impacts because it is down canyon and down wind of the Planning Area. Greatest impacts would be when heavy smoke flows down the drainage during the night. Atmospheric mixing would keep this impacts short duration, several days. Each day would bring improved air quality. All these effects would be consistent with law.

See discussions under Wild and Scenic River about impacts of smoke to recreational use of the river.

Soils and Stand Productivity

The Forest Plan states the following goal**:** *Manage National Forest lands to maintain or enhance soil and land productivity.*

Forest Plan Standards and Guidelines *to maintain soil productivity potential include:*

- Minimize soil productivity reductions caused by detrimental compaction, displacement, puddling, and severe burning.
- Maintain a minimum of 80 percent of an activity area in a condition of acceptable productivity potential. (Less than 20% detrimental soil condition.)
- Plan and conduct land management activities so that soil loss from surface erosion and mass wasting will not result in an unacceptable reduction in soil productivity or in water quality.
- Management activities shall be designed and implemented to retain sufficient ground vegetation and organic matter to maintain long-term soil and site productivity.

Alternative A - No Action

Direct and Indirect Effects

Conditions in the analysis area will remain much the same as now. Slow accumulation of woody material, including smaller branches and duff, will continue unless interrupted by wildfire. Organic material buildup on the surface would increase productive capacity somewhat but increase the risk of widespread, high intensity wildfire that could remove large amounts of this material at once over large areas. That would likely detrimentally burn large patches of soil. The potential impacts from a wildfire are greater because the fire would burn at higher intensity than prescribed fire and more fuels are available because of the lower fuel moisture content in the summer.

Effects Common to All Action Alternatives

Direct and Indirect Effects

Impacts to soil productivity and detrimental conditions would be the same between alternatives because the Forest Plan measures impacts based on activity unit rather than across the landscape. Applying this standard at the landscape level would reduce the percent of detrimental conditions and not be meaningful. The scale of the project may increase the amount of acres within the planning area with detrimental soil conditions however all activity units are consistent with the Forest Plan; impacts to soil productivity would be immeasurable.

Utility of the harvester-forwarder system for ground-based harvest mitigates, to a great extent, potential compaction, water erosion hazard, and dry condition dusting which is important in this area where the soils have considerable volcanic ash content. Monitoring of timber sale activities indicates that Forest Plan Standards and guidelines are being met using forwarder systems on these soils. Nearly all of the smaller branches and needles left on site, where, even if later jackpot or underburned, would allow nutrient retention in the unit. The machinery operates on top of the slash, displacement of soil is low, less than 2 percent and compaction is less normally less than 4 percent. Virtually no landings need be constructed because the short logs can be decked along the haul roads confining impacts to existing roads. Monitoring of like operations, vegetation, and soil types on the Forest, indicates detrimental soil impacts from combined harvest activities to range between 4-8 percent.

Erosion hazard is all but eliminated when using forwarder/harvester systems; only occasional areas of bare soil limited to short sections (typically less than 25 feet in length) in a mosaic pattern that is not conducive to concentrating water sufficient to move soil. The slash left in the forwarder routes and the undisturbed debris on the forest floor contributes to holding soil on site.

The skyline yarding units would experience even less soil disturbance, limited to yarding corridors and log-end ground contact. Past monitoring of skyline corridors where one-end suspension occurs shows that the distance and continuity of the bare soil surface rarely is sufficient to allow for erosion from

concentrated water flow. Slash and surface roughness is adequate to reduce erosion and when needed the hand erosion control measures taken have been very effective.

The proposed temporary road construction would compact soil and reduce the productive capacity of that portion of ground becoming a road. This area is small compared to the total activity area; trees would be able to grow through the reconditioned soils and help to further break up any residual compaction, there would be no measurable impact soil productivity at the activity unit level. Ripping or other tillage activity would improve the infiltration, reduce or eliminate erosion hazard, and improve seed bed character upon completion, increasing the ability of the disturbed area to support vegetation but leave it in a reduced productive capacity compared to native soils. Full obliteration would most fully return productive capacity over the long term. The impact of temporary roads to soil productivity would be added to the unit it occurs in. Temporary roads are proposed in Units 21, 30, 46 and 47, 66, and 80; Table 4-12 summarizes the potential detrimental impacts to soils for each of the units. Units 21 and 30 are skyline units. Past monitoring of temporary roads in combination with harvest indicates that Forest Plan standards and guidelines would be met.

Relation to Forest Plan Standards & Guidelines: Monitoring of other harvest activity on the Umatilla indicates cut-to-length processors and full-suspension forwarders result in detrimental soil impacts (per Plan definition) in the 5 to 10 percent range (including fuels treatments in most cases, hence the slightly higher range than indicated above) with lesser compaction (in particular) on the shallower soil types. The residual soils, and those with thin volcanic ash mantles (10 inches or less), have high strength in dry conditions and do not compact easily. They are still susceptible to surface displacement. The deeper soils, most with high ash content, are still susceptible to compaction even when dry, as soil strength does not increase in ash soils to the same degree as in other parent materials. The results with the in-woods processors (including the cut-to-length systems using forwarders) have been quite favorable. The slash mats spread compressive forces while little to no displacement occurs as there are minimal turning forces or dragging of trees to cause the removal or mixing of surface soil. Landings often overlap existing roads thereby limiting additional impacts to otherwise unaffected soil areas.

Prescribed Fire

Effects of concern from prescribed fire activity would be related to areas of severe fire intensity and total exposed soil surface subject to potential erosion hazard. The prescription for underburning and the pattern of heavy fuel concentrations are prime determining factors affecting the extent of high severity burn areas. Monitoring of contemporary prescriptions indicates that underburning rarely creates severe burn conditions and the total area of severely burned soils is expected to be very small: usually 0 to 5 percent in broadcast treatment areas, up to 10 percent of treatment areas if there are numerous concentrations of heavy fuels loadings resulting from either harvest activity or natural down woody conditions. Exposed soil would be scattered in a mosaic pattern similar to heavy fuel loading patterns, rarely in continuous areas that could become an erosion hazard. Forest Plan standards and guidelines would be met; there would be no measurable impacts to soil productivity.

Jackpot burning tends to remove the fine fuels leaving behind pieces greater than 5 inches resulting in soil impacts similar to underburning. The extent of severely burned areas is highly variable depending on the concentrations numbers, its location, and burning conditions. The prescribed burn conditions calls for leaving a portion of the duff layer and monitoring indicates that duff is being retained and that detrimentally burned soils conditions over 100 square feet rarely occurs. Forest Plan standards and guidelines would be met and there would be no measurable impact to soil productivity.

Mechanical Slash Treatments

The use of mechanical slash treatments adds additional equipment traffic over the soils while generally reducing the number of spots of severe burn intensity. Mastication (slashbusting) equipment is proposed to reduce created and existing slash and protect the remaining stand that includes a proportion of fire

intolerant species. The equipment is usually mounted on a small-body excavator with wide tracks to reduce ground pressure. They have relatively low ground-pressure and can work on top of downed logs and existing or created slash but can produce additional compaction and some displacement while turning. Operation on downed slash and other woody material and use of existing trails keeps additional compaction and displacement effects very low. Monitoring of grapple-piling operations on the Umatilla indicates detrimental soil impacts in the 0-2 percent range.

Cumulative Effects:

Residual impacts from previous management activities over the past several decades have been estimated through field review of the proposed harvest units. Activities include road building, timber harvest, site preparation, livestock grazing, fire suppression activities and prescribed fire. The concern, from a soils standpoint, is whether additional impacts to the soil resources resulting from the proposed activities would accumulate adverse impacts to soil characteristics sufficient to affect productivity. Cumulative effects relative to erosion hazard is not relevant within treatment units as surface recovery occurs rapidly enough to eliminate this as a cumulative concern. Observations from monitoring of skid trails and temporary roads with minor cuts and fills showed that there is a rapid regrowth of vegetation after use. Undisturbed roots resprouted within a week after use.

The field review of units that had prior tractor skidding showed they were well recovered. Residual impacts were estimated using the Region 6 protocol. There were no units that had severe damage that would require an in depth survey. The contribution of residual impacts was based on the detrimental soil condition (DSC) determined by the field review.

The proposed harvest systems and/or operating conditions have been developed in response to concern over soil impacts. Use of harvester/forwarder equipment and designated forwarder routes minimizes additional displacement and compaction effects. Old trails and landings are used as much as possible. The estimated detrimental soil conditions displayed in Table 4-11 includes residual conditions from prior activities. In conjunction with use of existing trails or landings, proposed activities can be expected to stay well within Forest Plan standards and guidelines.

Areas of prescribed burns may add incrementally to the total area of severely burned soils in the area, but should be minimal if ignited within the burning prescription. Exposed soil created by prescribed fire would be short-term, 1 to 2 months for spring burns and up to 6 months for a fall burn, until the vegetation recovers.

Areas that would experience the most cumulative disturbance are those units with proposed harvest activity, mechanical fuel treatment, and prescribed fire. Monitoring of like areas and activity on the Forest indicates detrimental soil condition levels range from 5-12 percent range, with the higher percentage in units with less downed wood and slash, deep ash soils, or shallower soils where equipment operated in wet conditions. These operations typically reuse the same trails for equipment movement; therefore have overlapping traffic effects where little additional increase in detrimental disturbance occurs.

When reviewing the units for existing condition levels the soil scientist did not find any units with higher (moderate) existing disturbance levels that would also be planned for both mechanized fuel treatment and follow-up burning. See Appendix H for table of soil attributes for each of the units.

Table 4-12. Cumulative Effects measured by Detrimental Soil Conditions for Alternative B (DSC)

Unit	Log Sys	Acres	Number of Past Harvest Entries	Prescribed Fuel Treatments	Thick Ash Soils	Existing DSC condition from past Harvest	Percent DSC Residual Impact	Impact from Temp-orary Road	Addi-tional Percent DSC from treatments	Total DSC
03	FO	25		SB	Y	Low	0		8	8
08	FO	29		SB	Y	Low	0		8	8
12	FO	29		JP	Y	Low	0		8	8
13	FO	15		JP	Y	Low	0		6	6
14	FO	39		JP	Y	Low	0		8	8
15	FO	24	1	JP	Y	Mod	6		6	12
17	FO	52	1	JP	Y	Mod	6		6	12
18	FO	4		JP	Y	Low	0		6	6
19	FO	9		SB	Y	Low	0		8	8
20	FO	33		JP	Y	Low	0		6	6
21	SH	5		YUM	N	Low	0	2.7	2	5
22	SH	11		YUM	Y	Low	0		2	2
23	FO	16		SB	N	Low	0		8	8
24	FO	21		JP	Y	Low	0		6	6
27	FO	9		SB	Y	Low	0		8	8
29	FO	15	1	SB	Y	Low	2		8	8
30	SH	47		JP	Y	Low	0	1.5	4	6
31	FO	11		SB	Y	Low	0		8	8
32	FO	21		SB	Y	Low	0		8	8
33	FO	21	1	SB	Y	Low-Mod	6		8	14
35	FO	18		SB	Y	Low	0		8	8
38	FO	10		SB	Y	Low	0		8	8
39	FO	6		SB	Y	Low	0		8	8
40	FO	29		SB	Y	Low	0		8	8
43	FO	73	1	SB	Y	Low	2		8	10
45	FO	112	1	JP	Y	Low	2		6	10
46	FO	11	1	SB	Y	Low	2		8	10
47	FO	50	1	SB	Y	Low	2	2.6	8	13
48	FO	3		SB	Y	Low	0		8	8
49	FO	8	1	SB	Y	Low	2		8	10
50	FO	30	1	SB	Y	Low	2		8	10
51	FO	30		UB/JP	Y	Low	0		6	6
58	FO	40		SB	Y	Low	0		8	8
60	FO	95	1	SB	Y	Low	2		8	10
61	FO	64	1	SB	Y	Low	2		8	10
62	FO	25	1	SB	Y	Low	2		8	10
63	FO	83	1	SB	Y	Low	2		8	10
64	FO	47	1	SB	Y	Low	2		8	10
65	FO	52	1	SB	Y	Low	2		8	10
66	FO	37		SB	Y	Low	0	0.8	8	9
67	FO	95	1	SB	Y	Mod	2		8	10
69	FO	10		UB/JP	Y	Low	0		6	6

Unit	Log Sys	Acres	Number of Past Harvest Entries	Prescribed Fuel Treatments	Thick Ash Soils	Existing DSC condition from past Harvest	Percent DSC Residual Impact	Impact from Temp-orary Road	Addi-tional Percent DSC from treatments	Total DSC
72	FO	3		UB	Y	Low	0	-	2	2
73	SH	11		UB	Y	Low- Mod	0		2	2
74	FO	37		SB	Y	Low	0		8	8
75A	FO	19	1	JP	Y	Low	2		6	8
75B	FO	71	1	SB	Y	Low	2		8	10
78	SH	10		UB	Y	Mod	6		2	8
79	FO	26	1	JP	Y	Low	2		6	8
80	FO	65		SB	Y	Low	0	0.6	8	9
81	FO	32	1	SB	Y	Low	2		8	10
84	FO	13		SB	Y	Low	0		8	8
85	FO	55		SB	Y	Low	0		8	8
86	FO	11	2	JP	Y	Mod	6		6	12
89	FO	20		UB/JP	Y	Low	0		6	6
90	FO	54		JP/SB	Y	Low	0		8	8
110	FO	21	1	SB	Y	Low	2		8	10

Differences for Other Action Alternatives:

Direct and Indirect Effects

Alternative C would use helicopter rather than skyline yarding which would slightly reduce the total amount of soil disturbance by eliminating the yarding corridors and occasional log-end ground contact.

Water Quality and Hydrologic Function

The Forest Plan states the following Goal; *To manage National Forest resources to protect all existing beneficial uses of water and to meet or exceed all applicable State and Federal water quality standards as amended by PACFISH.*

Treatment alternatives will be evaluated based on their affect to water quality (water temperature and sedimentation), drainage network extension, riparian condition, and water yield.

Effects are summarized from input provided by the Hydrologist found in the *Lower Sheep Timber Sale and Fire Reintroduction Project Hydrologic Report*, and supplemented in the EA. Impacts are identified by subwatershed and summarized at the watershed level.

Alternative A - No Action

Direct Indirect and Cumulative Effects

Water Temperature: Water temperature in the streams of the analysis area would continue as described in Chapter 3, Existing Condition. Past timber sale activities have affected stream shade by removing conifers from near channel areas on some streams. In this alternative as in all action alternatives, no actions would occur to retard the recovery of vegetation. Streamside shade would recover at a natural rate and this could lead to somewhat cooler water temperatures. On private lands interior to and outside of NFS lands, there has been some modification of stands adjacent to channels in the Sheep Creek, Meadow Creek, and Jarboe Creek drainages, which has not been quantified.

Sediment Effects: The existing sediment regime in the streams of the analysis area would continue, as it would under all action alternatives. Some road maintenance would be foregone. The reduction in erosion and sedimentation associated with these foregone activities would be small relative to background and not measurable. Past harvest related erosion and sedimentation would continue to recover.

Drainage Network and Riparian Condition: The drainage network (the system of channels and streams which drains the area) would remain the same in this alternative. Riparian condition would continue to develop along its current trend. Near channel areas harvested in the past would continue to grow at a natural rate improving riparian condition over time. The opportunity to achieve a very slight reduction in fuel loading on certain RHCA acres would be foregone, as backing fires associated with action alternatives would not take place.

Water Yield: Subwatersheds in the Lower Sheep have a harvest history going back to the mid 1960s. ETA calculations for the existing condition range between 2 percent and 9 percent for the subwatersheds in the analysis area and at less than 5 percent for the Lookingglass Watershed and less than 4 percent for the Grande Ronde River-Rondowa Watershed (Table 2). No effects to flow regime would be expected at this level of ETA, and none have been seen.

Alternative B - Proposed Action

Direct and Indirect Effects

Water Temperature: There would be no change in water temperature from proposed harvest activities. Design criteria would protect shade on stream channels (Design Features and Management Requirements, chapter 2). PACFISH interim RHCA widths range from 1-2 tree heights depending on flow regime and the presence/absence of fish (USDA Forest Service, 1995). Shade is controlled by about 1 tree height (FEMAT, 1993). Fire ignition for activity fuel and landscape fuel treatments would not occur inside RHCAs but fire would be allowed to back into RHCAs. No ignition and increased moisture in RHCAs would cause fire intensity to drop and reduce fuel consumption. Shade would not be significantly reduced and potential effects to water temperature would be negligible.

Sediment Effects: The proposed actions include 1,812 acres of commercial harvest by various logging systems, mechanical fuels treatments, and burning for fuels reduction in harvest activity units and outside of them (Table 4-13). Associated road use includes commercial log haul and administrative use of roads, temporary road construction and culvert replacement and new culvert installation. These types of actions have the potential to expose soil, increasing the risk of erosion and sedimentation.

Table 4-13. Proposed Actions by Alternative

TREATMENT	Alt. B	Alt. C	Alt. D	Alt. E
Harvest (acres)				
Forwarder	1728	1124	1069	1087
Skyline	84	0	21	21
Helicopter	0	84	0	0
Total	1812	1208	1090	1108
Fuel Reduction				
Burning outside of Harvest Units	2763	2763	2763	2763
Burning inside of Harvest Units	572	332	298	241
Mechanical treatment of fuels (inside and outside of Harvest Units)	1267	901	833	908
Total	4602	3996	3894	3912
Road Use (miles)				

TREATMENT	Alt. B	Alt. C	Alt. D	Alt. E
Haul roads inside perennial and fishbearing stream RHCAs	4.84	4.84	3.65	2.37
Temporary road construction	2.02	0.71	1.12	1.50
Maintenance	56.33	52.13	34.94	30.24
Culverts, New and Replaced	4	4	4	4

Design criteria for timber harvest include implementation of PACFISH/Forest Plan interim widths of no-harvest RHCAs as well as assignment of appropriate logging systems. These design criteria would prevent damage that could contribute to erosion and sedimentation into channels and streams (Belt et al, 1992). Skyline logging systems, which cause minimal soil disturbance, would be used on 84 acres. Skyline systems would suspend at least one end of logs and ground disturbance would be limited to corridors. Harvester/forwarders would be used to harvest areas where slopes are less than 35 percent, about 1,728 acres. Trails would be spaced to an average of 50 feet. There would be more surface disturbance than with the other systems used in this project, especially near landings. Slash would be deposited on the trails as logs were processed. This is the primary mitigation of this logging system, the equipment runs on slash rather than on the soil surface. Landings would be located adjacent to roads or on flat terrain outside of PACFISH RHCAs and would be rehabilitated at the end of sale operations. Existing disturbed areas would be used when possible. Other standard erosion control mitigations and best management practices, i.e. water-bar construction in skyline corridors, would be used where needed to prevent erosion in trails and skyline corridors.

Systematic implementation monitoring of design criteria and Best Management Practices (BMP) was conducted on the Pomeroy and Walla Walla Ranger Districts during the 2001, 2002, and 2003 field seasons. Implementation of PACFISH RHCAs has been monitored prior to harvest (after marking) and after harvest. A high level of compliance has been documented which generally meets or exceeds PACFISH interim direction. Bare soil on forwarder trails was monitored in 2001. Twenty-four trails in 10 units of the Abla and Cliffhanger Timber Sales were evaluated for spacing, gradient, and percent bare soil. Standards for trail spacing and gradient were met. An average of 1 percent mineral soil exposure was measured on forwarder trails. Since trails occur on about 10 percent of harvest acres, the total soil exposure was about .01 percent of harvest acres (Umatilla National Forest, 2001-2002). This is a negligible amount of soil exposure and is widely scattered on the landscape.

Commercial harvest would create small, scattered patches of bare ground that would have a low risk for erosion. Surrounding undisturbed vegetation and RHCA protection would prevent transport of any eroded sediment into surface waters in Alternative B.

Prescribed fire would be used for fuels reduction in some harvest units and on the landscape without mechanical treatment (Table 4-13) over a period of 5 years. Underburns would blacken about 60 percent of the acres burned and model techniques estimate that about 30 percent of that area would have exposed mineral soil, or about 18 percent of the total area (Nancy Rencken, personal communication). About 75 percent of the grass type would be blackened, with about 20 percent soil exposure. Jackpot burns could expose less mineral soil. Mechanical fuels treatment (mastication) would be used on most harvested acres. These machines would work in existing forwarder trails, from the bottom of harvest units to the top, to maximize the time spent on slash. Some soil disturbance would be expected from the blade.

Exposed soil would be surrounded and buffered by remaining duff and vegetation. Slope distances on exposed mineral soil would be short, preventing significant overland flow from developing and the

surrounding duff and vegetation would act as a filter, should any sediment move. In forested areas, natural mulching by needles and leaves would provide some ground cover before the first winter.

No ignition for any fuels treatment would occur in RHCAs. Fire would be allowed to back into them to provide the benefits of fuel reduction to these areas. Fire intensity and the extent of fire coverage would generally be reduced in RHCAs because no ignition would occur to maintain the fire. Some mineral soil would be exposed in near channel positions, but less than in the upland portions and with a mosaic pattern. There would be very little effect to existing down material and vegetation density in near channel positions.

The use of hand cleared brush line, black line, and natural control points would minimize construction of fire line. The timing and pattern in which the projects take place would determine how much control line would be needed. No soil disturbance would be associated with fire control line inside of RHCAs and therefore there would be no effect to water quality.

There is a low likelihood of erosion from prescribed burning due to short slope lengths of exposed soil and the risk of sedimentation is low due to surrounding unburned debris and vegetation. However, because mineral soil might be exposed adjacent to channels, a small amount of sediment might enter channels during intense storms and spring runoff for the first year after burning. It is very unlikely that sedimentation would occur at levels that would measurably affect water quality or deposition in channels. A mosaic of unburned vegetation adjacent to channels and woody debris and other channel roughness would slow and reduce the transport of any sediment that might enter channels from these activities. This risk would not extend beyond the first growing season after burning due to regrowth of surface vegetation and accumulation of natural mulches.

About 2 miles of temporary road construction would occur under this alternative. This road construction is on uplands and not associated with drainages. The haul route for the proposed timber sale would cross numerous intermittent and ephemeral channels and would be in the RHCA of fishbearing and other perennial streams for about 4.84 miles. Road maintenance associated with harvest activities would include blading, cleaning culverts, and ditch cleanout. Short term, negligible sediment effects would occur where these activities are near channels. Road maintenance activities improve the effectiveness of road drainage which would reduce erosion and the benefits of reduced sedimentation would occur immediately. The potential for sedimentation from haul on roads inside RHCAs would be minimized by road use standards (see Fisheries section of Chapter 4). Improvement of road drainage on all haul routes due to associated road maintenance would offset haul sedimentation to some degree.

Two aging culverts on ephemeral draws would be replaced with larger culverts on FR 6231 in the Sheep Creek drainage. Two new culverts would be added on this road, one a ditch relief culvert and the other to provide an overflow for Sheep Creek as it crosses under this road. This culvert would pass highest flows of Sheep Creek until funding for replacement of the main culvert can be obtained. Culvert replacement would occur during dry channel conditions on ephemeral and ditch relief culverts. At Sheep Creek, sediment barriers would be placed to prevent sedimentation during the installation of the overflow culvert. No sediment would move from the culvert replacement sites until fall rains or spring runoff. Sediment affects would be negligible and occur locally during the first runoff events. Benefits from these projects, reduced risk of culvert failure due to age or under sizing, and reduced erosion and sedimentation, would begin immediately and continue for the foreseeable future. These benefits exceed the negligible impacts to sedimentation and vegetation which would occur from culvert installation.

Drainage Network and Riparian Condition: The location of temporary road construction has been identified and those road segments would be located in upper slope positions with no stream crossings. There would be no change in the length of the drainage network from the construction or use of temporary roads.

No mechanical vegetation manipulation would occur within RHCAs. Fire would be allowed to back into RHCAs that are adjacent to treatment units. Fuels reduction inside RHCAs would be limited by the reduced intensity of prescribed fire. Current stand structure and its development would remain unaffected. Large wood and other terrestrial inputs as well as shade would be maintained and would develop through time.

Cumulative Effects with Alternative B

Water Temperature: Past timber sale activities have affected stream shade on several of the streams of the analysis area by removing conifers from near channel areas. All alternatives would protect and allow the recovery of vegetation, which could lead to cooler water temperatures. There would be no detrimental effects to water quality from the proposed actions. Downstream of NFS lands there has been some modification of stands adjacent to channels in the Sheep Creek, Meadow Creek, and Jarboe Creek drainages which has not been quantified. Since the proposed activities would have no measurable impact to stream temperatures, there would be no cumulative effect with activities on private lands.

Sediment: The sediment load in the streams of the Analysis Area on NFS lands is probably higher than historic due to past timber harvest, which disturbed soil near channels and from which erosion occurred. These areas have revegetated and are recovering. Channel adjustments which are taking place due to prior management activities (Chapter 3) are contributing to an increase in sediment load. In addition, roads near channels and road crossings are a source of increased sediment load. These contributors to sediment load are unmeasurable, due to their dispersed locations, and are nonpoint sources of sediment which are managed with design criteria, Best Management Practices (BMPs), and restoration activities.

Private land harvest near Sheep Creek in 2003 and planned for 2005 includes uncut buffers on the stream. Other reasonably foreseeable projects include possible subsoiling of old clearcuts to rehabilitate soils. Treatments would be designed to prevent the possibility of sediment entering channels and no detrimental effects would occur or cumulate with the projects proposed in the Lower Sheep analysis. Riparian restoration treatments could include planting hardwoods, a negligible short term sediment effect and long term beneficial temperature and bank stability effect. Replacement of additional culverts, including 2 on FR 62 in the Sheep Creek drainage would be designed to minimize sedimentation during installation, and would be analyzed separately with a detailed cumulative effects analysis. Culvert replacement in perennial streams generally causes a short term sediment pulse with short and long term benefits to fish passage and watershed function.

The proposed action has been designed to prevent damage that could lead to erosion and sedimentation by implementing PACFISH interim RHCA widths, adopting appropriate logging systems for the topography, and maintaining roads. Backing fires in a small number of acres of RHCA could lead to bare soil adjacent to channels and some immeasurable and negligible erosion and sedimentation could occur over the short term.

Negligible, short term sediment effects which could occur from timber haul inside RHCAs, backing fires in RHCAs and from culvert installations would be offset to some degree by improvement to the road system. The negligible sediment effects from the proposed action would not lead to a concern for water quality or affects to channel morphology and would not detrimentally cumulate with existing or foreseeable sediment affects from other actions on NFS and private lands.

Drainage Network and Riparian Condition: The road system on NFS lands is connected to the drainage network at road crossings. Most roads are located on ridge tops or mid slope and the ratio of miles of road located in RHCAs relative to miles of RHCAs is small (Table 4-13). Information is not available for roads on private lands. The proposed action would not change the drainage network.

Past restoration activities in Jarboe Meadow including the elimination of grazing about 1990, and 2002-2003 treatments designed to reduce or control canary reed grass along Jarboe Creek combined with native hardwood plantings have improved channel condition and provided missing vegetation components that,

if successful, would improve bank stability and shade for Jarboe Creek. Ongoing permitted grazing and trespass grazing has a small, localized effect on riparian vegetation and near channel exposed soil. Improvements in animal management have reduced but not eliminated the detrimental effect.

On NFS lands riparian condition would be maintained and allowed to develop along its current path. Backing fires in RHCAs would not damage existing structure and would only minimally reduce fuel loading. Alternative B, the Proposed Action would neither contribute to the reduction of riparian condition in this portion of the subwatershed, nor improve it. Private lands exist interior to the NFS lands analyzed in this project and downstream of NFS lands. There is little specific information but private harvest and grazing has occurred and is likely to continue to occur in areas near channels. The continued control of trespass cattle from private lands would retain the low impacts observed in riparian areas. Grazing on the private lands would not impact vegetation of NFS lands.

Because there is no change to the riparian condition or drainage network from proposed, there would be no cumulative effect to drainage network or riparian condition from Alternative B.

Water Yield: The Umatilla National Forest equivalent treatment acre (ETA) model (Ager and Clifton, 2003 in draft) was used to evaluate the potential for changes in water yield and peakflow due to harvest. There is no explicit ETA standard on the Umatilla National but ETA is used as a surrogate for a standard that requires less than 30 percent of a subwatershed to be in the 0-10 year age class. ESA consultation for listed fish species includes this parameter in the project evaluation matrix. Analysis is typically applied individually to subwatershed (10,000-40,000 acres).

NFS lands were analyzed using this model. Results are displayed in Table 4-14. Harvest history information came from the Forest GIS database. Road miles, including proposed temporary road construction, were converted to acres and included as non-recovering openings, overstating their effect to ETA. Harvest and fuel treatments were combined to take account of all mortality that could be associated with the proposed project. Mortality associated with fuels treatments was modeled at the highest level that would stay within silvicultural prescriptions, but is likely to be much lower. All treatments were modeled to occur in 1 year (2006) though prescribed fuels treatments would occur over a period of about 5 years. The Lower Sheep Timber Sale and Fire Reintroduction Project proposes treatment in two (2) 5th order watersheds. All subwatersheds with NFS acres in these watersheds were analyzed and a cumulative ETA value was calculated for each watershed. The relationship between created openings and changes in water yield and peak flows has been documented by numerous studies. Recent reviews of literature demonstrate that the relationship is highly variable (Stednick, 1995 and Scherer, 2001). Generally effects are not seen below 15-20 percent ETA, and in a local study effects were not seen below 50 percent ETA (Helvey 1995).

Table 4-14. ETA by Subwatershed and Watershed for Proposed Alternatives, NFS Lands

SWS	Subwatershed Name		Alt.A		Alt.B	Alt.C	Alt.D	Alt.E
		Year	ETA	Year Cut	ETA	ETA	ETA	ETA
Upper Grande Ronde/ Lookingglass Watershed								
170601041001	*Upper Lookingglass*	*2003*	*5.9%*	*2006*	*3.9%*	*3.9%*	*3.9%*	*3.9%*
170601041002	Little Lookingglass	2003	2.2%	2006	2.3%	2.2%	2.2%	2.0%
170601041003	Jarboe Creek	2003	8.7%	2006	8.0%	7.2%	6.1%	6.3%
170601041004	*Lower Lookingglass*	*2003*	*3.5%*	*2006*	*2.3%*	*2.3%*	*2.3%*	*2.3%*
Watershed total		2003	4.4%	2006	3.6%	3.4%	3.2%	3.2%
Lower Grande Ronde/ Grande Ronde River-Rondowa Watershed								
170601060101	Sheep Creek	2003	6.9%	2006	7.8%	7.0%	6.9%	7.1%

SWS	Subwatershed Name		Alt.A		Alt.B	Alt.C	Alt.D	Alt.E
		Year	ETA	Year Cut	ETA	ETA	ETA	ETA
170601060102	GrandeRonde. R./Clear Creek	2003	5.4%	2006	10.4%	8.7%	10.1%	10.1%
170601060103	*Elbow Creek*	*2003*	*4.8%*	*2006*	*3.3%*	*3.3%*	*3.3%*	*3.3%*
170601060104	Grande Ronde R./ Bear Creek	2003	1.9%	2006	1.7%	1.7%	1.7%	1.7%
170601060106	*Grande Ronde R./ Slickfoot Creek*	*2003*	*0.5%*	*2006*	*0.5%*	*0.5%*	*0.5%*	*0.5%*
Watershed total		2003	3.9%	2006	4.3%	3.9%	4.1%	4.1%

Subwatersheds not in the Lower Sheep Analysis Area

Calculated ETAs are substantially below levels where water yield and peak flow effects might be seen for both watersheds as well as for individual SWS in all alternatives.

Information about recent and foreseeable timber harvest on private ownerships inside the National Forest boundary was gathered from landowners (Dohrmann, 2004). Based on that information it was estimate that about 2 percent of SWS 170601060101 (Sheep Creek) and about 2 percent of SWS 170601060102 (Grande Ronde R./Clear Creek) has been or will be clearcut between 2002 and 2005. Other recent harvest has been partial removals. The timeframe and location (same SWS) of these harvests overlaps with proposed Forest Service projects. With this magnitude of treatment, it is unlikely that private actions would cumulate with the proposed project to measurably change water yield or peakflows of the streams in the analysis area as they leave the National Forest System.

Effects common to Alternatives C, D, E

Direct and Indirect Effects

Water Temperature: There would be no effect to water temperature in any of the action alternatives since stream shade would be maintained and allowed to develop along its current course, as discussed in Alternative B, the proposed action.

Sediment Effects: Sediment effects of all proposed management actions would be controlled by design criteria, BMPs, and mitigations as discussed for Alternative B. Fewer acres of harvest are proposed in these alternatives than the Alternative B proposal (Table 4-13). Helicopter logging systems would be used on 84 acres in Alternative C. Helicopter systems minimize mineral soil exposure which would be scattered on an otherwise undisturbed ground surface. Commercial harvest would create small scattered patches of bare ground that would have a low potential for erosion and no potential to affect water quality due to surrounding undisturbed vegetation and RHCA protection. There would be no difference between any of the action alternatives in this regard.

Landscape level fuel reduction proposals are the same for all action alternatives, with fewer acres of fuels reduction treatment inside harvest units for these alternatives since the amount of harvest is less (Table 4-13). Percent soil exposure and disturbance mechanisms would be the same for these alternatives as for Alternative B, but overall disturbance would be somewhat less, due to fewer acres of treatment. As in Alternative B, ignition would not occur inside RHCAs for any of these alternatives. Sediment effects from fuels treatments would be negligible; however since backing fires could expose soil near channels, a small amount of sediment could enter channels during intense storms and spring runoff for the first year after burning. It is unlikely that sedimentation would occur at levels that would measurably affect water quality or deposition in channels. Sediment effects from fuels treatments would not differ measurably between action alternatives.

Road use, maintenance, and construction vary between alternatives (Table 4-13) based on which units are proposed. All temporary road construction is in upland positions and is outside of RHCAs. The potential for sediment from this construction to reach surface water would be negligible and no there would be no measurable difference to water quality between any of the action alternatives and the no action alternative due to temporary road construction. Haul routes inside the RHCAs of fishbearing and perennial streams would decrease from 4.84 miles in Alternative B to 2.37 miles in Alternative E. Miles of road maintenance also decrease. There would be slightly less likelihood of sedimentation as miles of RHCA haul decreases but lower levels of road maintenance, which largely consists of improvements to road drainage, would offset this reduction to some degree. Sediment effects from culvert replacements would be the same for these alternatives as for Alternative B. The degree of difference in sediment effects due to road use and construction would be negligible between alternatives.

Drainage Network and Riparian Condition: The temporary road construction proposed in Alternatives C, D, and E would not be connected to the drainage network and therefore would not extend the drainage network.

Riparian condition would not be measurably affected in any action alternative, as described in Alternative B. Current stand structure and its development would remain unaffected and terrestrial inputs to channels would be maintained.

Cumulative Effects Common to Alternative C, D, and E

Alternatives C, D, and E propose fewer acres of harvest, the same acres of fuel reduction outside of harvest units, and less overall use of the road system than Alternative B (Table 4-13). The cumulative effects analysis for Alternative B identifies sediment effects, which would be immeasurably small, from fuels reduction outside of units and from culvert replacements on FR 62. These effects would occur in all action alternatives. Immeasurably small effects to drainage network and to the sediment regime of Sheep Creek from a new road crossing on Fry Creek would occur in Alternative E. None of these alternatives would detrimentally affect riparian condition, nor measurably improve it.

Potential effects to water yield from these alternatives would be less than that identified in Alternative B, since fewer acres of harvest on NFS lands would occur (Table 4-14). No measurable effect to water yield would occur due to implementation of any of these alternatives in conjunction with what is known of foreseeable future harvest on private lands.

Past actions, ongoing actions, and foreseeable future actions, as identified in Alternative B, remain the same for these alternatives. As in Alternative B, design criteria, BMPs, and mitigations would be used to prevent damage to water and riparian resources. Short-term, localized effects would be seen from culvert replacements on FR 62, but would not cumulate with other proposed or identified actions.

Riparian and Fish Habitat

The Forest Plan states the following Goal: *To provide and maintain a diverse, well-distributed pattern of fish habitat. The goal applies to all area dominated by riparian vegetation, including area containing anadromous fish, perennial and intermittent stream courses, wetlands, and floodplains.*

This section summarizes and supplements the effects disclosed in the Fisheries Report. The analysis looks at various components of fish habitat to determine how the project may impact these individual components and than looks at what it means overall to the habitat. Because the majority of the project stays out of RHCAs, except for portions of haul and backing fires that would be allowed to enter RHCAs, many of the components and riparian functions that support fisheries habitat are not impacted. Those components that have an impact from the project are nearly immeasurable and do not change much from the existing condition.

Alternative A - No Action

Direct and Indirect Effects

Riparian areas would continue to recover from past actions and those reaches that presently have high quality fisheries habitat would retain that high quality condition.

The one major unknown is the risk of wildfire causing catastrophic damage to the watershed. A large, high intensity fire could severely degrade aquatic habitat. Fuels have become more complex with a buildup of fuel sufficient to support a large high, intensity fire. The no-action alternative would do nothing to reduce this risk, but would rather allow fuel to continue increasing. A large fire in the Grande Ronde Canyon would degrade the limited fisheries habitat in Lower Sheep and Meadow Creek but not have a measurable effect on listed species survival because these portions of streams have limited use. The local extirpation of redband trout could occur in the interior of the Planning Area.

Effects Common to all Action Alternatives

Direct and Indirect Effects

Temperature: There would be no impact or changes to water temperature. The Implementation of PACFISH RHCA's standards and guidelines for all action alternatives would ensure that streamside activities with potential to alter shade or stream width/depth ratios would not occur causing no change to water temperatures.

Chemical contaminants and/or nutrients: Vehicular fluids (fuels, lubricants, coolants), fire management compounds (fire retardant mixes, wetting agents, fire starters) and ash are potential sources of water contaminants associated with implementation of any alternative.

Except for some roadwork, culvert replacement, and some travel on existing roads, vehicles would be operated outside of PACFISH RHCA's. All vehicle service (including helicopters) and fuel storage would be outside of PACFISH RHCA's, and fuel storage sites would be provided with berms, absorbent material, or other containment devices. Experience with using these protections measures in the past indicates there would be no contamination of petroleum products into streams.

Magnesium Chloride (MgCl) would be applied outside of PACFISH RHCA's as needed for dust abatement. Since MgCl would not be applied inside of PACFISH RHCA's and migration of this compound through the soil appears to be very slow, it would not reach streams. Only water would be used for dust abatement inside of RHCA's. Whenever water is drafted for roadwork or dust abatement, appropriately sized screens would be used to prevent fish entrainment.

Prescribed fire operations are planned and implemented so that aerial application of fire retardants would not be needed. If fire suppression measures are needed to keep the prescribed fire within the burning boundary, hand application of water via bladder bags or truck mounted pumps would be used. Sometimes wetting agents (detergents, soaps, surfactants) are used with the water. Wetting agents are toxic to fish if applied directly to water but they would not be used near surface water. Wetting agents bind quickly to organic substances and are rapidly biodegraded so are unlikely to be flushed into streams after applications to fuels. Stream water contamination is not expected from wetting agents or fire retardent.

Ignition for prescribed fire would be principally of two types, hand ignition with drip torches and aerial ignition with the use of a helicopter. Drip torches use a mixture of diesel fuel and gasoline which would be toxic if it reached streams in sufficient quantity. The mix is prepared off site and carried in small quantities, less than 100 gallons. Experience has indicated that spills do not occur.

Aerial ignition would be via plastic spheres containing potassium permanganate and antifreeze (principally ethylene glycol) dispensed from the helicopter. Although both ethylene glycol and potassium permanganate are toxic neither persists long in the natural environment. Ethylene glycol is of low

toxicity and is dispersed and diluted rapidly in water and is subject to rapid biodegradation. Potassium permanganate is a strong (very reactive) oxidizing agent and quickly reacts with organic materials in the environment until it is consumed, producing innocuous oxides and salts of potassium and manganese. Neither of these would be applied inside of PACFISH RHCA's and so the only risk of stream contamination from these compounds would be from a spill and every precaution would be taken to prevent spills. Concern has been expressed that the plastic spheres used in helicopter ignition might bounce or roll into RHCA's or streams, even though the application would be outside of them. People with experience in aerial ignition (Jim Beekman, pers. comm.) have observed that the plastic spheres remain at or close to the initial ground contact point. This is because 1) the spheres are small relative to the surface roughness of the terrain, and 2) the chemical reaction between the potassium permanganate and the ethylene glycol inside of the sphere proceeds rapidly, and by the time the spheres contact the ground, heat produced by the reaction has softened the plastic to the extent that it cannot retain its spherical shape, deforms upon striking the ground, and does not roll. The risk of contamination of water from these sources is very low and not expected.

Since fire would be permitted to "back" into riparian areas and RHCA's there is likelihood that some small amounts of ash could enter stream courses. Because of dilution factors and the natural buffering capacity of open surface waters the small amounts of ash that would reach streams from this project would not alter the streams pH. Ash produced eutrophication is not expected because the amount of ash entering streams would be undetectable.

There are no other known sources of chemical contamination to rivers or tributary streams on National Forest lands and conclude that the proposed Lower Sheep project management activities present essentially no risk of increasing levels of chemical contaminants in Lower Sheep area streams or the Grande Ronde River. In fact, the tributary streams flowing from the National Forest would have a diluting effect to contaminant levels in the Grande Ronde River.

This project would not measurably add chemical contaminants and nutrients to the stream systems or cause degradation of habitat. There are no other sources of contamination that causes a concern for cumulative effects.

Physical barriers: No culverts are proposed for installation within fish bearing or perennial streams and all other activities are proposed outside of RHCAs; the project would not fragment habitat or create fish passage barriers.

Substrate embeddedness and sediment: Substrate embeddedness is dependent upon sedimentation. An increase in suspended sediment or turbidity can adversely affect fish by being deposited in spawning gravels or by avoidance. Prescribed fire along the hill slopes facing the Grande Ronde River and Sheep Creek could cause increases in suspended sediment or turbidity in waters with listed fish present. The prescribed fire would not be ignited inside of PACFISH RHCA's but would be allowed to "back" into the RHCA's. It is possible that the backing fire could at some point burn hot enough in this area to expose bare soil closely adjacent to the stream channel. Rains following the prescribed fire could wash soil into the stream channel. The amounts of sediment that might enter the stream channel as a result of this activity would depend on how the fire burned within the RHCA and weather conditions. The effect on fisheries habitat would be very small and are unlikely to be sufficient to degrade habitat or adversely affect listed fish.

Other project activities with potential to affect suspended sediment are associated with logging activities, such as roadwork and log haul. Most roadwork would be outside of RHCA's, however, there would be some road maintenance inside RHCAs consisting of blading, brushing, surface replacement, and culvert installations. Though some of these activities would temporarily generate sediment into streams the levels would be immeasurable and the work would improve or maintain watershed conditions by reducing potential sediment sources from roads and protecting roads from damage.

Four culverts would be installed on Forest Road 6231. Two are ageing culverts needing replacement and two new culverts would be installed in the Sheep Creek drainage. The culvert replacements would be in ephemeral draws where they would be replaced with larger culverts. One of the new culverts would be a ditch relief culvert. The other would be an overflow culvert installed beside the existing undersized culvert at Sheep Creek where it crosses under this road. This culvert would pass high flows of Sheep Creek and help avoid overtopping and eroding of the road. The overflow culvert for Sheep Creek would be installed outside of the wetted channel and sediment barriers would be placed to prevent disturbed soil from reaching the stream during the installation process. The remaining three culverts would be installed under dry channel conditions.

A small sediment flush from the culvert work would be expected during the first fall rains or spring runoff. Habitat of ESA listed steelhead, Chinook, and bull trout is several miles downstream of these activities, below a series of barrier waterfalls. Redband trout inhabit Sheep Creek. Sediment delivery would be slow from the initial installation as it moves over the floodplain or debris strewn channels. The first year water moves through the overflow pipe would create a flume however it would also be diluted by spring flows and not expected to measurably alter the sediment flux in habitat of any ESA listed fish at the Grande Ronde River or impact redband trout.

Some winter logging would be expected with the Lower Sheep project. Timber falling and decking would be done over snow or frozen ground and expected to cause stream sedimentation. Log haul for winter logging could cause some road surface erosion because it may not always be possible to haul over dry or frozen road surfaces. Roads would be plowed to permit winter log truck traffic. Snow plowing for these roads leaves a thin (one to two inches) layer of snow on the road to avoid damaging the road surface during snow plowing operations. While upper elevation roads may have adequate snow cover or frozen ground to prevent soil erosion, lower elevation roads may be wet or if dry there will often be a transition zone that at times would be thawed and wet with snowmelt. This situation would run more risk of road surface erosion and stream sedimentation wherever roads run close to or across streams. On the haul route for the Lower Sheep timber sale there are 4.8 miles of roads within RHCAs on National Forest lands. This includes both those roads that cross and those that parallel streams. These reaches are all upstream of ESA listed fish habitat. Stream sedimentation from this source would be largely prevented by standard Forest Service road use rules incorporated into the timber sale contract. These allow the Forest Service to halt commercial road use whenever:

1) damage to the road surface or water quality occurs, or

2) operations create a continuous discharge of sediment laden water into live streams that result in a turbidity increase.

These road rules have been effective in reducing sediment deliveries because contract monitoring indicates that timber haul would usually be voluntarily suspended by the timber purchaser before these conditions were reached.

Some of the haul route would be on a gravel surfaced county road outside of the Forest boundary, about one-half mile of which is within the RHCA of the Grande Ronde River; a stream with ESA listed fish. This portion of road is near the confluence of Lookingglass Creek in the section of the Grande Ronde River that would provide good fisheries habitat because it is cooled by Lookingglass Creek. Haul over this route during wet weather could increase sediment yield from road surfaces. It is probable that log truck traffic here when water was running off the road surface would increase sediment delivery to the Grande Ronde River. Direct impacts to fish would depend on the convergence of very wet weather simultaneously with log haul, and in any case the amount of additional introduced sediment would be very small such that measurable amounts of additional sediment introduction from this source would be discountable and diluted by the high quality water coming from Lookingglass Creek.

Most of the log haul and harvest would occur during dry weather in the summer. Dust abatement would keep road surfaces firm and logging practices would not expose large areas of soil. Erosion would be trapped on site because the majority of the area would remain in cover, past monitoring indicates 2 to 4 percent exposed soil is expected with skyline and forwarder logging systems and the RHCAs would provide additional filtration. Sediment delivery from the project would be immeasurable within the interior of the Planning Area and not expected to degrade or change the existing condition of fisheries habitat and not impact redband trout.

Because none of the component activities of the Lower sheep project would significantly alter the sediment flux, substrate embeddedness would be unchanged. The discountable amount of sediment potentially delivered to the Grande Ronde River would not be measurable against background turbidity and be flushed from the system by the high flows of the Grande Ronde River.

Large woody debris: Since all timber harvest would be outside of PACFISH RHCA's, it would not alter frequencies of in-stream large woody debris.

Under alternative B and C skyline corridors would be cut through the RHCA of a non-fish bearing intermittent stream. Occasional trees would be felled and left on site to provide passage of logs in ten skyline corridors. Since trees would be left on site the amount of woody debris reaching the stream channel would not be altered. The stream is not fish-bearing and would have no effect on the woody debris component of fish habitat.

Prescribed fire, since it would be allowed to back into RHCA's, could kill trees which might fall into the stream channel increasing the frequency of large woody debris. There is little chance for large woody debris frequencies to be altered by prescribed fire because fuels in riparian areas tend to have higher moisture contents than fuels in surrounding areas and the prescription would require the burn to take place when humidity within the RHCA is high. Fire is not likely to burn extensively or intensively in riparian areas protecting large wood from being consumed.

The low levels of large woody debris added by this project would be unnoticeable in fisheries habitat. It would occur primarily in intermittent streams between two skyline harvest units and the drainages along the slopes above the Grande Ronde River and Sheep Creek. The burning could create a peak in large wood recruitment in the intermittent streams but not as much as with a wildfire. Down wood recruitment would occur over 15 years depending on the size and species killed by the prescribed fire. Future, periodic, burns would add additional down wood.

Pool frequency and quality: None of the proposed project activities would change the flow regime. Prescribed fire could potentially alter riparian vegetation. In the areas where prescribed fire might enter riparian areas the channels are mostly of Rosgen types A and B, which are mostly step-pool type channels highly resistant to such changes. The proposed activities would not alter pool frequency.

Refugia: None of the proposed alternatives would affect the buffering, size, or number of refugia for listed fish. The activities do not occur within highly populated habitat of ESA listed species.

Floodplain connectivity: Floodplain connectivity would not be impacted by any of the alternatives. No management activity is proposed within the floodplain. The additional culvert where FR 6231 crosses Sheep Creek would help maintain floodplain functions and protect it from damage during high flows. Providing the relief culvert would keep the creek from flowing over the road and causing a washout condition that could adversely impact fisheries habitat.

Change in peak/base flows: The effects of each alternative were analyzed using an Equivalent Treatment Acres (ETA) model. This model incorporates the effects of roads, fire, and past and proposed timber harvest for National Forest lands. Although results have been highly variable, (Stednick 1995; Scherer 2001) effects to water yield are not generally seen below 15-20 percent ETA. No subwatershed

surpasses 15 percent, and would not be expected to cause detectable changes in water yield or to peak or base flows.

Effects that differ between Alternatives

Road density and location: Depending on the alternative selected, up to 2.0 miles of temporary road would be constructed for the Lower Sheep project. The subwatersheds in the Planning Area have high road densities. The temporary road construction represents a short-term increase in road density while they are in use. All alternatives would slightly increase road density in these subwatersheds (Table 4-15) however they would be decommissioned after use, sloped to drain, subsoiled to restore a degree of infiltration, and revegetated. The temporary roads are located along ridgetops so would not contribute to the drainage network. The area would continue to provide high quality water to the Grande Ronde and Lookingglass systems. The less than 0.1 mile per square mile increase in road density would be short-term, 1 to 3 months, and would not impact fish habitat. The roads are not located in RHCAs nor connected hydrologically to fisheries habitat.

Table 4-15. Comparison of New Road Development by Project Alternative Jarboe and Sheep Creek Subwatersheds (combined)

New Road Work and Use	Miles of Added Road				
	Alt A	Alt B	Alt C	Alt D	Alt E
Temporary (non-system) roads (miles)	0	2.0	0.7	1.1	1.5
Existing system roads (miles)	72.83	72.83	72.83	72.83	72.83
Total (miles)	72.83	74.83	73.53	73.83	74.83
Combined area of Jarboe and Sheep Creek Subwatersheds (miles^2)	22.61	22.61	22.61	22.61	22.61
Existing road density (miles/mile^2)	3.22	3.22	3.22	3.22	3.22
Project road density (miles/mile^2)	3.22	3.31	3.25	3.27	3.31
Road density increase (miles/mile^2)	0	0.09	0.02	0.05	0.09

Summary of Impacts to Fisheries and Riparian Habitat:

Direct and indirect impacts to the above habitat components are not expected to degrade the quality of fisheries habitat in the planning area. Restrictions and limited activities proposed in the PACFISH RHCAs protects fisheries habitat. Any reduction to overstory shade near perennial streams by prescribed fire is not expected to cause a measurable increase in water temperatures. Mortality along intermittent streams, either from prescribed fire or cutting of trees for skyline yarding, would increase large woody debris within the RHCA. The expected low intensity fire backing into the RHCA would reduce surface fine fuels causing little exposed soil. Riparian functions would be retained. Floodplain functions would be protected by the installation of a relief culvert to better handle high flows on Sheep Creek. Road maintenance that includes 7.5 miles of surface rock replacement would help maintain water quality by reducing potential road sediment on high traffic roads and maintain efficient drainage.

Summary of cumulative effects: All ongoing and reasonably foreseeable future federal activities in these watersheds would either maintain or improve aquatic habitat conditions. There would be immeasurable impacts to fisheries habitat because of the safeguards put in place by RHCA's, in-water work windows and timing of other activities. There would no cumulative effects with downstream private lands.

Impacts to Threatened and Endangered Species, Sensitive Species, and Management Indicator Species.

The four action alternatives differ very little in effects to ESA listed fish, sensitive species, or aquatic habitat. Since there is slightly more road work under alternatives B and E, they would affect resident redband trout more than alternatives C or D.

Impacts of this project are not expected to degrade the quality of fisheries habitat in the planning area. Restrictions and limited activities proposed in the PACFISH RHCAs protects fisheries habitat. Any reduction to overstory shade near perennial streams by prescribed fire is not expected to cause a measurable increase in water temperatures. Mortality along intermittent streams, either from prescribed fire or cutting of trees for skyline yarding, would increase large woody debris within the RHCA. The expected low intensity fire backing into the RHCA would reduce surface fine fuels causing little exposed soil. Riparian functions would be retained. Floodplain functions would be protected by the installation of a relief culvert to better handle high flows on Sheep Creek. Road maintenance that includes 7.5 miles of surface rock replacement would help maintain water quality by reducing potential road sediment on high traffic roads and maintain efficient drainage.

All ongoing and reasonably foreseeable future federal activities in these watersheds would either maintain or improve aquatic habitat conditions. The safeguards put in place by RHCA's, in-water work windows and timing of other activities, would ensure that the proposed Lower Sheep project activities would not contribute to downstream effects, even when combined with effects from operations on privately owned lands.

Because there is some very small possibility that project activities could affect ESA Threatened bull trout, Snake River steelhead, Snake River spring/summer Chinook salmon or Snake River fall Chinook salmon it was determined that the project may affect but not likely to be adversely affect these species. Likewise, regarding the R6 Sensitive redband trout, some of the proposed Lower Sheep project activities may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. Steelhead and redband trout are Forest Plan management indicator species.

Columbia duskysnail (*Lyogyrus sp*.): The Regional Forester lists one Sensitive invertebrate species as suspected present on the Umatilla National Forest. Known potential habitat for this species, the Columbia duskysnail, was surveyed in the summer of 2004 and no specimens were found (Kristy Groves, pers. comm. 2005). This project will have no impact on this species.

Ecosystems and Diversity

The Forest Plan states the following goal: *To Provide for diversity of plant and animal communities and tree species consistent with overall multiple-use objectives for the forest. Maintain or enhance ecosystem functions to provide for long-term integrity (stability) and productivity of biological communities.*

Effects are summarized from input provided by the silviculturist found in the Lower Sheep *Silviculture Report* and from the wildlife biologist in *Consistency of the Proposed Action with Eastside Screens Report (Appendix G)*, and supplemented in the EA. The analysis area for the Historic Range of Variability was the Planning Area. See Appendix K for definitions of structural stages.

Table 4-16. Changes in Moist Forest Structural Stages due to Harvest.

Alternative	Changes	SI %	SEOC %	SECC %	UR %	YFMS %	OFMS %	OFSS %
HRV	Percent	1 to 10	0 to 5	5 to 25	5 to 25	40 to 60	10 to 30	0 to 5
Alt A (Current Condition)	Acres Changed	None	None	None	None	None	None	None
	Percent	18	32	4	2	14	12	18
Changes that would result from Alt. B	Acres Changed	+59	-38	0	-10	-11	0	0
	Percent after Treatment	18	32	4	2	14	12	18
Changes that would result from Alt. C	Acres Changed	+48	-27	0	-10	-11	0	0
	Percent after Treatment	18	32	4	2	2	12	18
Changes that would result from Alts. D	Acres Changed	+59	-38	0	-10	-11	0	0
	Percent after Treatment	18	32	4	2	14	12	18
Changes that would result from Alts. E	Acres Changed	+59	-38	0	-10	-11	0	0
	Percent after Treatment	18	32	4	2	14	12	18

Impacts to the Moist Forest Biophysical type: The low amount of regeneration cutting proposed in the action alternatives would not measurably change the existing condition of the structural class for Stand Initiation in Moist Forest. The percent Stand Initiation would remain 18 percent. In general, the proposed thinning and group sections would not measurably change the percent of any of the structural stages in the planning area.

Table 4-17. Changes in Dry Forest Structural Stages due to Harvest.

Alternative	Acres Changed % Planning Area	SI %	SEOC %	SECC %	UR %	YFMS %	OFMS %	OFSS %
HRV	Percent	5 to 15	5 to 20	1 to 10	1 to 10	5 to 25	5 to 20	15 to 55
Alt A (Current Condition)	Acres Changed	0	0	0	0	0	0	0
	Current Percent	2	20	30	3	5	26	14
Changes that would result from Alts. B, C, D, and E	Acres Changed	0	0	0	0	0	0	0
	Percent after Treatment	2	20	30	3	5	26	14

There is no proposed harvest in either of the Old Forest structural stages in Dry Upland Forest PVG. Intermediate harvest actions (thinning and improvement cut) and uneven-aged harvest actions (individual tree selection), which leave fully stocked stands are proposed in other structure classes. Therefore, there are no changes in structural stages.

Alternative A - No Action

Direct and Indirect Effects:

The landscape would continue its present trend. In many stands, vertical diversity would remain at high levels because of the shade tolerant species in the understory. Horizontal diversity would remain high for early successional stages but would be reduced as plantations age. Multistrata stands dominated by late seral species, already the largest stand type, would increase in the landscape. Single stratum old forest stands would become multi-strata stands. In Dry Forest, this would take the area further from the historic range of variability. Western larch and ponderosa pine would not regenerate because of closed canopies and the lack of stand disturbance events; there would be a continued loss of early seral tree species. Stands would tend to become uniform as insects and diseases kill the larger diameter trees and the younger grand fir and Douglas-fir take their place. Landscape diversity would continue to become more uniform in forest structure and the amount of forest edge would be reduced as plantations age.

Fuel conditions would transition to higher risk because of insect and disease mortality and the continued development of ladder fuels. In the mixed severity fire regime stands would approach the time when they have missed a fire cycle. In the Frequent fire regime stand replacement wildfire could occur, with higher levels of effects than in the past. Mortality levels would be high including the killing large diameter trees that would have historically been resistant. The historical resilience of the frequent fire regime would change with fewer trees surviving a wildfire event.

With time, early successional stands become young forest and begin to blend with the mature forest. In Moist Forest the Stand Initiation structural class is higher than HRV. In 15 years there would be a reduction in early successional stages as plantations age, bringing the area closer to HRV. Wildfires could develop extensive areas of early successional stages, at a cost to larger trees and old forest stands.

A wildfire would likely create stand initiation above HRV for the frequent fire regime, which s not the norm. Extensive stand initiation in the Moist Forest, above historic ranges, would be expected. Horizontal diversity would be lost or reduced either from aging of the stands or from a wildfire creating homogeneous, stand replacement, conditions on the landscape.

Effects Common to All Action Alternatives

Direct and Indirect Effects

Fire historically played a major role in maintaining forest landscape diversity, structure, and resiliency. Due to the mosaic nature of the regimes on the landscape, some of the mixed fire regime is at the short end of the fire return interval around the rim of the Grande Ronde River Canyon and the disturbance regime favored early seral (ponderosa pine and western larch) tree species. The proposed silvicultural treatments are mostly thinnings that would remove one-third or less of the basal area from the smaller diameter classes in the lower canopy layer. The vast majority of proposed treatments would not change structural stages because the overstory character would be unchanged and the stands would move closer to conditions characteristic of historic fire return intervals by reducing stocking levels, allowing remaining trees to grow faster in diameter, reducing the amount of multi-layered area, and reducing fuel loading. The treatments would increase the percent of early seral western larch in the stands. Alternative B maintains or restores 4,231 acres of forest; Alternative C, 3,755 acres; Alternative D, 3,623 acres; and Alternative E, 3,613 acres. The reduction in stocking levels would allow faster growth and would increase resilience. The reduced fuel structure would protect the large trees from wildfires. Vigor of the remaining trees would increase, reducing the risk of mortality from insect epidemics.

The proposed landscape prescribed fire would begin the process of restoring open dry forest structure on the landscape. Small understory trees and vegetation would be burned with the prescribed fire, reducing vertical stand complexity. This change is what would be expected historically for the Grande Ronde canyon on a landscape maintained by frequent fires.

Alternative B proposes harvest in the Old Forest Structural Stages in the Moist Forest biophysical type; approximately 23 net acres on 113 gross acres of Group Selection (HSEG) in 4 units, and 452 acres of intermediate harvest in 10 units. See the wildlife section for a discussion on Old Forest Habitat.

Table 4-18. Proposed Harvest Changes to Structural Stages by Alternative

Alternative	Total Acres Treated	No Change Acres	SEOC to SI Acres	UR to SI Acres	YFMS to SI Acres
B	1,812	1,753	38	10	11
C	1,208	1,149	27	10	11
D	1,090	1,031	38	10	11
E	1,108	1,049	38	10	11

Cumulative Effects

The discussion of direct and indirect effects considers past harvest, including clearcuts and plantations, in the Historic Range of Variability. All past management actions affecting vegetation have been included and there would be no cumulative affects with this project; the proposed treatments do not measurably change structural stages. The future regeneration restoration project would take efforts to restore forest cover in an area heavily seeded to grasses. Successful regeneration of this area would return forest cover and allow the stand to develop through historical successional stages.

Wildlife Habitat

Effects have been summarized from input provided by the wildlife biologist found in the *Lower Sheep Timber Sale and Fire Reintroduction Project Wildlife Report*, and supplemented in the EA.

Big Game Habitat

Environmental Consequences Unique to No Action

Direct/Indirect Effects

The amount and distribution of hiding cover and thermal cover would not change in the short-term (20 years). The quantity and quality of hiding cover would also not change in the short-term. E2 and C4 management areas would continue to meet Forest Plan standards for satisfactory and total cover. HEI would also continue to meet standards in the short-term, and the open road density would remain between 1 and 2 miles per square mile.

Over the long-term (beyond 20 years) given current fire suppression policies, stands would continue to develop a multistory structure, increasing the amount of satisfactory, marginal, and total cover above what is currently present. Stands would begin to shift from forage to marginal cover, and marginal cover to satisfactory cover where there is the capability to do so. The development of more hiding and thermal cover would be beneficial to big game species, particularly in Management Area C4. Conversely, as stands continue to develop multi-layer canopies, trees become stressed for water, etc, and are more susceptible to insect and disease outbreaks and high severity wildfires. Vulnerability of big game would also increase following these events due to decreased hiding cover.

Management Indicator Species: Rocky Mountain Elk

Elk and deer populations would respond in various ways to potential habitat changes, however, many other factors influence numbers, such as weather, predation, and forage nutrition quality on summer and winter ranges. In general, little change in numbers would be expected with the current state deer and elk management strategies.

Environmental Consequences Common to All Action Alternatives

Direct/Indirect Effects

Harvest of diseased trees, thinning, and fuels treatment activities would not reduce the total amount of big game thermal cover in the area, however satisfactory cover will be converted to marginal, and hiding cover would be reduced.

Proposed activities in all alternatives would reduce satisfactory cover in Management Area (MA) C4 by 2 percent (Table 4-19). Since these stands would be thinned to meet the recommended site stocking level, they would still qualify as marginal cover post-treatment. About 175 acres of satisfactory cover would be converted to marginal cover. The remaining satisfactory cover would provide security habitat over 15.4 percent of the planning area, which is just above forest plan standard of 15 percent. The Habitat Effectiveness Index (HEI) value for C4 would drop one point in all alternatives, from 63 to 62. This value is above the forest plan minimum of 60 in MA C4.

The amounts of satisfactory cover in Management Area E2 converted to marginal would differ slightly between alternatives, however all would result in retention of 20-26 percent, well above the forest plan minimum of 10 percent. The HEI value for E2 would drop one point in all alternatives except for Alternative B, which drops two points. All alternatives would stay within the forest plan minimum standard of 45 for E2.

Table 4-19. Forest Plan standards for Big Game habitat compared to treatment effects.

Indicator of Response	Minimum Plan Standard	Alt A	Alt B	Alt C	Alt D	Alt E
C4 Percent Satisfactory Cover	15	17.4	15.4	15.4	15.4	15.4
C4 Percent Total Cover	30	61	61	61	61	61
C4 Habitat Effectiveness Index (HEI)	60	63	62	62	62	62
E2 Percent Satisfactory Cover	10	26	20.5	22	23.5	23.6
E2 Percent Total Cover	30	59	59	59	59	59
E2 Habitat Effectiveness Index (HEI)	45	62	60	61	61	61

The quantity and distribution of satisfactory cover and marginal cover is not expected to change as result of proposed fuel treatments, however, hiding cover would be reduced. Jackpot burning and slash busting (mastication) to treat fuels would temporarily remove some shrubs, grasses, and seedlings from the understory in treated stands. Within a year after burning, these types of vegetation would re-occupy the burned area, with increased forage quality for big game. The overstory composition and structure would not change with these types of fuel treatments. Mechanical fuels treatments would encourage new growth of grasses and shrubs, and improve elk mobility in stands that currently contain heavy fuel loads. Reductions in accumulated fuels and changes in fuel continuity would reduce the risk of large, high severity fires in the future, which otherwise would remove cover, further decrease HEI, and increase animal vulnerability.

The landscape burning would involve a low intensity fire that may creep into stringer cover stands in the canyons. A few individual overstory trees, and possibly entire stands, could die. On the open hillsides, forage for big game in these areas would be greatly improved. Burning would stimulate bunchgrass growth and increase nutrient availability for several years.

Open road densities would not change under any alternative. Temporary roads and existing closed roads will be open temporarily for harvest and fuels activities, however they will remain closed to the public and closed immediately when the project is done.

Management Indicator Species: Rocky Mountain Elk

Use of temporarily opened roads together with treatment activities would result in short-term disturbance to elk and other big game. Often big game avoid work areas only during periods of human activity, and return to use stands at night after work has ceased. Harvest, fuels, and road activities would be restricted near an elk calving area until August to reduce stress to cows and calves. Elk and deer populations would respond in various ways to potential habitat changes, however many other factors influence numbers, such as weather, predation, and forage nutrition quality on summer and winter ranges. In general, little change in numbers would be expected with the current state deer and elk management strategies.

Cumulative Effects

A portion of the available cover in the analysis area was previously converted to forage habitat, resulting in the current cover and forage condition. While proposed harvest (commercial thinning and harvest of diseased or insect/dwarf mistletoe-infested trees) would overlap much of the area harvested in the past, new areas would be harvested as well, additionally reducing the amount of satisfactory cover. Proposed fuel treatments (mechanical and prescribed fire) would contribute to ongoing efforts to reduce ground fuels on the district. This would begin to reverse the effects of decades of fire exclusion. Reductions in accumulated fuels and changes in fuel continuity would reduce the risk of large, high severity fires in the future, which otherwise could eliminate large tracts of wildlife habitat.

The combination of past activities and disturbances and proposed treatments would cumulatively affect satisfactory cover, but total cover would remain the same. Past grazing, timber harvest, and road building on a large block of private land within the planning area has reduced the habitat quality for big game.

Activities in the area that have been beneficial to big game include noxious weed treatment, and restoration of Jarboe Creek and meadow. Restoration of some old clear cuts that are not regenerating has also been proposed as a potential project.

Cumulatively the effects of proposed activities in combination with other existing and potential future effects are not expected to have negative impacts to Rocky Mountain elk and other big game species. Beneficial projects, such as restoration of old clear cuts and enhancement of aspen, would restore habitat. Timber harvest and fuels treatments would have short-term impacts, but the overall health of the stands will be improved. The quality of big game habitat would be unchanged to slightly improved by the burning and opening of crowns; improving growth of shrubs and herbaceous species in forested stands and grasses within the canyon.

Snag and Down Wood Habitat

Environmental Consequences Unique to No Action

Direct and Indirect Effects

At the watershed scale, dead standing trees and down wood would continue to occur at current densities and size classes for the next 3 to 5 years. Numerous factors influence the length of time snags remain standing on a site, including weather events, diameter, tree species, height, aspect, slope, elevation, and soil type/moisture (Bull et al. 1997). Diameter is one of the most important factors that influence snag fall rates; typically, large diameter snags (>20 inches dbh) stand longer on a site than smaller diameter snags (Bull et al. 1997).

With the existing management direction, including fire exclusion, snag and down wood densities would increase over the next 5 to 10 years due to mortality from natural causes such as drought stress, wind throw, insects and disease. An increase in snags and down wood could combine with current tree

densities, stand composition, and structure to increase the susceptibility of the analysis area to large-scale wildfire. A high severity fire could then reduce or eliminate snags and down wood currently occupying the analysis area.

Management Indicator Species: Pileated woodpecker and other primary cavity excavators

In the short term, habitat quality for the pileated woodpecker and other primary cavity excavators would be maintained or would improve. Stands would continue to develop old growth habitat characteristics (large trees, large snags, down wood, multi-story canopy) in the long-term. The quantity and quality of habitat for the pileated woodpecker would improve due to their preference for these habitat characteristics. Any increase in disease and insect occurrence could improve habitat by creating foraging and nesting habitat (dead wood). In the longer term, there is an increased risk of wildfire that could reduce the quality of pileated habitat by changing stand structure and composition. Woodpeckers would respond to an uncharacteristically large or high severity wildfire by shifting their use to adjacent unburned or lightly burned stands. The black-backed woodpecker and Lewis' woodpecker would benefit due to their preference for recently burned stands.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect Effects

Proposed commercial thinning and group selections would reduce snag and down wood densities in the planning area, reducing habitat for primary cavity excavator species. Although no currently existing down wood would be removed with harvest, there would be fewer snags to provide down wood in the future. A portion of the dead standing trees >10-inches DBH would be removed. However, the largest snags available would be retained in all units. A minimum of 2.25 snags >10 inches diameter would be retained per acre to meet Forest Plan standards as amended. Operation of machinery, preparation of landings, and fuels treatments would also require the occasional falling of snags that pose a safety hazard to workers. The amount of snags and down logs that would be affected would be small, since existing landings and skid trails would be used where available. Some snags would likely be consumed during prescribed burning, but some green tree mortality is also expected. Green trees damaged by burning would die over a 5-year period, creating new habitat for cavity nesting birds.

A minimum of 3-6 down logs (in the dry plant association) or 15-20 down logs (in the moist plant association) would be retained per acre to meet Forest Plan standards as amended. Burning prescriptions would be designed to create low intensity fire, which would be unlikely to consume large downed wood, although charring would make affected logs less desirable as foraging habitat for some species of primary cavity excavators.

The effect on snag density was evaluated at the scale of available Current Vegetation Survey (CVS) data in the Grande Ronde-Rondowa Creek and Lookingglass watersheds. The estimated snag density in both the >10-inch diameter group and the >20-inch diameter group would be reduced by less than one percent in both Dry Forest and Moist Forest (Table 4-20). Because a large number of snags are available in this area, very little measurable difference can be shown between the alternatives. The reduction of snag numbers for the most influential alternative (B) is presented below. The effect on snags would be slightly less for all other alternatives because there would be fewer acres harvested.

Although snags would be reduced with timber harvest, many areas within the watershed will continue to exceed the densities described in DecAID. Areas outside the treatment units would retain current snag and down wood densities. Overall, adequate densities of snags and down wood would remain.

Management Indicator Species: Pileated woodpecker and other primary cavity excavators

In the short term, habitat quality for the pileated woodpecker and other primary cavity excavators would be maintained. Stands would continue to develop old growth habitat characteristics (large trees, large snags, down wood, multi-story canopy) in the long-term. When compared to the pileated woodpecker

cumulative species curves in DecAid for the Moist Forest habitat type, snag densities would continue to be below the 50 percent tolerance level for the >10-inch and >20-inch groups, but above the 50 percent tolerance level for other primary cavity excavator species. There would be no difference in the DecAid tolerance levels between action alternatives and No Action.

Cumulative effects

Past activities and actions in the analysis area have combined with natural processes to create the existing condition of the analysis area. The proposed commercial harvest and fuels treatments would combine with past harvest to further reduce standing dead wood habitat in the analysis area. Overall, past harvest in this area resulted in few large snags and green replacement trees remaining. Personal firewood collection and roadside hazard tree removals would contribute to snag reduction, however the overall effects on snag dependent wildlife would be small because removal typically occurs only within 150 feet of open roads. Firewood cutting does not generally occur on steep slopes or where access is poor. Snags on steep slopes, in riparian buffers, and in areas without road access would be retained for wildlife use. Past and ongoing fire exclusion has increased fuel loads and the potential for habitat loss from large-scale fire has increased as a result. Proposed thinning, underburning, and fuels treatments would begin to reverse the effects of fire exclusion in the planning area, thereby protecting future 'green forest' snag habitat.

Environmental Consequences Unique to Alternatives C, D, and E

Because fewer acres are harvested, Alternatives C, D, or E would better balance advancement of future habitat for Management Indicator Species while retaining existing habitat. Pileated woodpecker habitat would be unaffected over a larger area than with Alternative B. Alternative C in particular would leave the most old forest structure intact. Dense multi-story canopies, snags, and downed wood used for foraging, nesting, and denning would be maintained in those stands that otherwise would have been commercially thinned.

Table 4-20. Grande Ronde -Rondowa and Lookingglass Watersheds Pre and Post Treatment Snag Density, Alternative B

Potential Vegetation Group	DBH	Existing density snags/ac.	Watershed Ac.	Total snags	Post harvest min. avg. within units	Unit ac.	Total est. snags in affected areas	Total snags in affected areas post harvest	Potential snag loss	Remainder in Watershed	Resulting density snags/ac.
Dry Forest	>10"	8	23,000	183,770	2.25	137	1094	308	786	182,984	8
	>20"	1	23,000	26,220	0.14	137	156	19	137	26,083	1
Moist Forest	>10"	17	65,320	1,106,521	2.25	1670	28,290	758	24,532	1,081,989	17
	>20"	4	65,320	258,667	0.14	1670	6613	233	6379	252,288	4

Old Forest Habitat

Environmental Consequences Unique to No Action

Direct and Indirect Effects

In the short term (<20 years), late old structure and old growth would remain unchanged, and would continue to develop along existing successional pathways under current management direction. Late and old structure would continue to occupy 32 percent of the planning. Old Forest Single Stratum structure on dry sites would remain below the historical range of variability, and Old Forest Multi-Strata structure would remain above. In the short term, the number and distribution of existing large trees (> 21 inches dbh) in the analysis area would not change.

Indirectly, the amount of late and old structure would change over time. With continued fire suppression, late and old structure stands on Warm, Dry Upland sites would continue to develop into multi-storied, overstocked, mixed conifer stands, further reducing the amount of Old Forest Single Stratum structure below the historic range of variability.

According to the fuels report, susceptibility to high intensity crown fire would increase as moist forest stand structures develop vertical fuel profiles. Dry forest types would continue to be encroached by shade tolerant species, also creating multi-layered stands. Fire behavior in this area is expected to be moderate. If a fire occurs, some late old structure and old growth characteristics could be lost.

Connectivity between old forest stands would be maintained at current levels in the short term (<20 years). These corridors would allow the free movement of wildlife between different stand types in the analysis area. Over time, stands in early successional stages would develop habitat characteristics that would result in additional connective corridors. Wildfire, disease, or insect infestations may occur in the future and reduce the effectiveness of connective corridors for wildlife.

Environmental Consequences Common to Action Alternatives

Direct and Indirect Effects

Proposed activities are not expected to change overall stand structures (Table 4-20). Old Forest Single Stratum structure on dry sites would remain below the historical range of variability and Old Forest Multi-Strata structure would remain above. Thinning in old forest would decrease stand densities by thinning from the lower canopy layers, removing a portion of the understory canopy layers as well as overstory trees. Conversions from OFMS to OFSS are not expected because prescriptions call for retention of patchy understory, and jackpot burning should maintain it.

Retention of the largest trees would result in a larger average tree size within units. Reduced stocking levels would decrease stress and associated insect/disease susceptibility on the overstory trees that remain. On Dry Upland sites, ponderosa pine would be favored over all other species, moving treated acres toward Old Forest Single Stratum structure, which is currently deficient in this area. Treatments in stands currently classified as young forest would aid in attaining future late and old structure more quickly than if the stands were left in their current condition.

Underburning would occur near Dedicated Old Growth and other late and old stands as part of the landscape burning on the breaks of the Grande Ronde River. Meadow Creek and Sheep Creek border or flow through most of the Dedicated Old Growth. Fire ignitions would be focused on the open grassy areas, and would not occur within riparian areas. Mortality of some large trees could occur as fire creeps into the timbered stringers, but this would be unusual based on the expected fire behavior in this area.

While no loss of OFMS or OFSS stands are expected, wildlife species that are currently using these stands would be affected by the treatments to varying degrees. Existing habitat for some species such as the northern goshawk, pileated woodpecker, and some Neotropical migratory birds would be affected to a small degree simply because of stand disturbance and changes in microhabitats.

Connectivity in thinned stands would remain functional and allow the free movement of old-growth-dependent wildlife. However, the quality of connective corridors could be reduced in thinned stands due to reduced stand density, canopy cover, and snag densities. A few units will have small created openings designed to target disease, insects, or dwarf mistletoe problems, however these openings would be expected to occur anyway as these trees would be expected to die and fall. Treating these stands would benefit connectivity in the long-term by creating healthier conditions for tree development and growth.

Cumulative Effects

Past and continuing fire exclusion policies would perpetuate multi-storied structure in all stands. The action alternatives would combine with past activities, including harvest, to cumulatively reduce the quality of connective corridors between late and old structure stands in the short-term. In addition, past and ongoing fire exclusion has increased fuel loads and the associated hazard of losing additional late old structure and fragmenting travel corridors because of uncharacteristically large-scale, high severity fire. The proposed fuel treatments would reduce the risk of old growth loss to large-scale wildfire.

Table 4-21. Acres of old forest structure treated by alternative.

Old Forest Treated	ALT A	ALT B	ALT C	ALT D	ALT E
OFMS	0	486	0	150	240
OFSS	0	85	0	60	60
Total	0	571	0	210	300

Environmental Consequences Unique to Alternative B

Direct and Indirect Effects

Silvicultural and fuels reduction treatments would be implemented on 571 acres of OFMS and OFSS, or 8 percent of the existing LOS in the planning area (Table 4-21).

While no loss of OFMS or OFSS structure would be expected, wildlife species that are currently using these stands would be affected by the treatments to varying degrees. Existing habitat for some species such as the northern goshawk, pileated woodpecker, and some Neotropical migratory birds would be affected to a small degree simply because of stand disturbance and changes in microhabitats and reduction in dead wood.

Environmental Consequences Unique to Alternative C

Direct and Indirect Effects

Alternative C has no treatments proposed in late old stands, and no removal of trees > 21 inches dbh in all units. Sixteen units (571 acres) in the Old Forest Multi-Strata or Old Forest Single Strata that were proposed for harvest in Alternative B would not be treated. Effects to old forest structure and old forest habitat would be very similar to the No Action alternative, except that treatments outside of late and old structure stands will improve stand health and vigor on 1175 acres, which could promote the development of old forest in these areas

Alternative C would balance advancement of future old forest habitat with retention of existing habitat. For example, pileated woodpecker and northern goshawk habitat would be left undisturbed over a larger area than proposed with any of the other action alternatives. Dense multi-story canopies, snags, and downed wood used for foraging and nesting would be maintained in those stands.

Environmental Consequences Unique to Alternative D

Direct and Indirect Effects

Alternative D has 210 acres proposed for treatment in six late and old structure (LOS) stands, roughly two-thirds less treatment than proposed in Alternative B. Effects to old forest habitat would be very similar to the No Action alternative, except that treatments outside of late and old structure stands would improve stand health and vigor on 880 acres, which could promote the development of old forest in these areas in the long term.

Environmental Consequences Unique to Alternative E

Direct and Indirect Effects

Alternative E has 300 acres proposed for treatment in eight late and old structure (LOS) stands, roughly half the treatment proposed in Alternative B. Effects to old forest habitat would be very similar to the No Action alternative, except that treatments outside of late and old structure stands would improve stand health and vigor on 808 acres, which could promote the development of old forest in these areas in the long term.

Threatened, Endangered, and Sensitive Wildlife Species

Based on District records, surveys, and monitoring, as well as published literature about distribution and habitat utilization, species that may occur in the analysis area include the gray wolf, Canada lynx, northern bald eagle, peregrine falcon, California wolverine, Rocky Mountain bighorn sheep, and Columbia spotted frog.

Environmental Consequences Unique to No Action

Direct and Indirect Effects

The current level of management in the area would not directly or indirectly affect any of the TES species potentially occurring in the planning area. None of these species are actually known to occur in the Lower Sheep planning area. The level of human disturbance would be expected to remain the same. Continued lack of fire could reduce forage value or change the distribution and quality of forage for wolf prey species, however, populations of elk and deer would likely continue to be plentiful. Since wolves are not currently known to occur in the area, and no denning or rendezvous sites are known, there would be no effect to gray wolf.

Lynx habitat would gradually improve over the next 20 years. Previously harvested areas would develop closed canopies and trees tall enough to provide snowshoe hare winter habitat. This could potentially bring the percentage of suitable lynx habitat up to at least 84 percent, and likely higher assuming no natural disturbances occur. Since lynx are not known to currently reside in the area and there would be no impact to lynx habitat; the No Action alternative would have no effect to Canada lynx.

There is the potential for bald eagle nesting and foraging, however, no use is documented within the planning area, therefore, there would be no effect to bald eagle.

The quality and quantity of forage for bighorn sheep and the abundance and distribution of prey animals for other TES species would not be expected to change. Habitat quantity and quality for the Columbia spotted frog would not change. There would be no effect on falcon nesting or wolverine denning habitat because none are known to exist in or near the planning area. There would be no impact to these sensitive species.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect Effects

Implementation of proposed activities should not directly affect any of the TES species potentially occurring in the planning area. None of these species are actually known to occur in the Lower Sheep planning area. Habitat for TES species would remain functional and available for potential occupancy. If any of these species happened to pass through or take up residence in the area, the increased traffic, equipment noise, and human presence could lead to temporary avoidance of the area.

Since wolves are not currently known to occur in the area, and no denning or rendezvous sites are known, there would be no effect to gray wolf. The open road density in the analysis area is expected to remain at less than 2 miles per square mile (on Forest Service lands). The quality and quantity of forage for ungulate prey species could slightly increase after closed canopy stands are thinned and grassy areas are burned.

Although there is the potential for bald eagle nesting and foraging, no use is documented within the planning area, therefore there would be no effect to bald eagle. The suspected nesting territory is outside of the planning area, and is far from any roads.

Bighorn sheep would benefit from landscape burning along the Grande Ronde River breaks. Burning would stimulate bunchgrass growth and increase nutrient availability. Habitat quantity and quality for the Columbia spotted frog would not be affected because all potential habitat for this species would be protected by excluding activities in Riparian Habitat Conservation Areas. The abundance and distribution of prey animals for other TES species would not be expected to change. There would be no impacts to peregrine falcon nesting or wolverine denning habitat because none is known to exist in or near the planning area.

Cumulative Effects to TES species:

Proposed treatment activities would begin to shift forest structure and species composition (that were changed by past harvest, livestock grazing, and fire suppression) back toward their historic trends. In the long-term this would begin to reverse the cumulative effects of past timber harvest and insect outbreaks and improve the sustainability of forest habitats.

Canada lynx

Environmental Consequences Common to All Alternatives

Direct and Indirect Effects

In the long-term, potential growth in vegetation is expected to result in indirect increases in suitable lynx foraging and denning habitat. About 5,900 acres of the 8,495 acres of unsuitable habitat identified were rendered unsuitable in the past 15 years by timber harvest or precommercial thinning. The overstory in these stands provides less than 50 percent canopy closure, and the understory is not yet above average snow levels. At least half of this acreage should achieve conditions that provide foraging for snowshoe hare within 15 years (~ 3000 acres). This could potentially bring the percentage of suitable lynx habitat up to at least 84 percent, and likely higher if no natural disturbances occur.

There is also the potential for wildland fire or insect and disease of unknown magnitude to alter vegetation and reduce habitat for lynx.

Implementing any of the alternatives would result in less than 30 percent of the lynx habitat in the Timothy LAU occurring in an unsuitable condition (Table 4-22), and so would be consistent with the Forest Plan as amended.

Table 4-22. Acres* of mechanical harvest in lynx habitat by alternative and the resulting percentage of unsuitable lynx habitat in the Timothy LAU.

Lynx Habitat	ALT A	ALT B	ALT C	ALT D	ALT E
Acres affected	0	608	330	0	84
Resulting % Unsuitable for Denning and/or Foraging	24	26	25	24	24

* = The numbers in Table 4-22 of unsuitable and suitable habitat do not directly add up when compared to Tables 4-23 and 4-24 because not all harvest will result in a change to an unsuitable classification. Acre calculations showing the intermediate steps are available in the Wildlife Specialist Report.

Environmental Consequences Common to Alternatives A (No Action) and D

Direct and Indirect Effects

Because there are no harvest activities proposed in lynx habitat in Alternatives A and D, there would be no effect to lynx. In the short-term, habitat for Canada lynx would not be changed in Alternatives A and D other than through natural processes; therefore, there would be no direct effects.

Cumulative Effects

Because there are no direct and indirect impacts from action to lynx habitat in Alternatives A and D, there are no cumulative effects to lynx habitat.

Environmental Consequences Common to Alternatives B, C, and E

Implementation of Alternatives B, C, and E may affect, but would not likely adversely affect Canada lynx. This determination is based on the low risks to lynx from the combined and individual actions under consultation, and because these actions meet or exceed recommendations found in the latest science regarding Canada lynx (Ruediger et al. 2000).

Mechanical harvest, low intensity burning (jackpot), and mastication (slash-busting) proposed in Alternatives B, C, and E would remove vegetation and change vegetation structure and patch distribution such that suitable lynx habitat, in most cases, would be converted to unsuitable (Table 4-23). None of the proposed landscape prescribed burning is within lynx habitat.

The harvest and fuels treatments in lynx habitat would result in stands with less than 50 percent canopy closure and a mosaic of stocking conditions, ranging from dense tree stocking to small gaps in the canopy. After thinning, the stands would have trees representing each layer, but at lower stocking. There would be a reduction in standing dead and down trees within units (Snag section). The habitat conditions in most harvested units would not be suitable for snowshoe hare, but would continue to provide habitat for red squirrels, an alternate lynx prey species. Jackstraw logs and root wads would be left intact to provide future denning areas for lynx and other wildlife. Harvest and fuels treatments would not preclude a return to suitable habitat in the future; these stands should develop into lynx foraging habitat in 15 to 20 years.

Other proposed activities that could affect lynx habitat include temporary road construction, roadside brushing, roadside hazard tree removals, rock pit expansion, and snow plowing.

Temporary roads would cause a temporary reduction of suitable habitat until they are ripped and planted with native seed upon completion of activities. Roadside brushing and hazard tree removal would only occur where necessary to eliminate safety hazards. The proposed expansion of one rock pit would

remove less than one acre of lynx denning habitat (section 10 off Forest Road 6200390). This stand is surrounded by existing clearings created for rock extraction. Closed roads that would be opened for the project would be closed upon completion, so open road density will remain low (< 2 mi/mi2) in lynx habitat. Given the low open road density (1.44 miles per square mile) in the area, and the location of the proposed road activities, no meaningful changes to lynx habitat would occur from road activities, when compared to baseline conditions.

Groomed snowmobile and ski routes, plowed roads, and snowmobile tracks all create compacted snow routes that can facilitate the movement of other predators into higher elevations and potentially compete with lynx for a limited prey supply. Snow plowing for winter logging may or may not be necessary depending on weather and timing of timber harvest. Plowing could occur on roads east and south of Forest Road 62 in order to haul logs to Elgin, Oregon. In the unlikely event that lynx are in the area, winter plowing could be detrimental to winter survival, however there is an abundance of lynx habitat in surrounding areas that could serve as refugia from these impacts.

Habitat connectivity within and between LAUs would be maintained. Proposed harvest units are near the southeastern perimeter of the LAU and would not effectively bisect or fragment interior lynx habitat. Project activities would not preclude free movement of lynx through the area. There are large blocks of lynx habitat in the adjacent wilderness area that currently provide core habitat. The Timothy LAU is bordered on the west side with the Mill Creek LAU via wilderness and other unmanaged areas. None of the proposed activities would change connectivity between these LAUs because no harvest would occur on the western side of the Timothy LAU.

Table 4-23 displays the net acre changes in the amounts of suitable foraging and denning habitat by alternative.

Table 4-23. Impacts of the proposed activities on lynx habitat in the Timothy LAU.

Timothy LAU	Current Condition/ Alt A	Alt B	Alt C	Alt D	Alt E
Total Acres Habitat	35038	35038	35038	35038	35038
Denning	4970	4893	4950	4970	4970
Foraging	21573	21116	21294	21573	21499
Unsuitable	8495	9029	8794	8495	8569
% Unsuitable	24	26	25	24	24
% Reduction in suitable	0	2	1	0	0

Table 4-24 displays the percentage changes in the amounts of suitable foraging and denning habitat by alternative compared to the Forest Plan standards. The percent of suitable foraging, suitable denning, and unsuitable habitat does not change in alternatives D and E from the current condition (Alternative A).

The percent of suitable foraging, suitable denning habitat is reduced from current condition in Alternatives B and C. The changes vary by 2 percent at most between alternatives, which reflect the small difference in acres of lynx habitat affected between alternatives.

Table 4-24. Percent lynx denning, foraging, and unsuitable habitat by alternative.

Timothy LAU	Standard	Current Condition/ Alt A	Alt B	Alt C	Alt D	Alt E
Denning	≥ 10	14	14	14	14	14
Foraging	-	62	60	61	62	62
Total Suitable for Denning or Foraging	≥ 70	76	74	75	76	76
Total Unsuitable for Denning or Foraging	≤ 30	24	26	25	24	24
% Reduction in Suitable	-	0	2	1	0	0

Implementing Alternatives B, C, and E would result in 24 to 26 percent unsuitable conditions in the Timothy LAU (Tables 4-22, 23, 24). These conditions would be fully consistent with the forest plan standard, as amended for the Lower Sheep project that no further reduction of suitable lynx habitat conditions should occur with vegetation management if more than 30 percent is already unsuitable.

The Forest Plan, as amended requires the maintenance of denning habitat in patches generally larger than 5 acres, and comprising at least 10 percent of lynx habitat in an LAU. Note the percent of denning habitat does not change in any alternative compared to current condition, because the number of acres reduced (77 acres) is less than 1 percent of the lynx habitat in the LAU.

Direct or indirect mortality of individual lynx are not expected because the Lower Sheep project does not propose any activities identified as mortality risk factors, and lynx are not known to be present (Chapter 3).

The effect of having 74 to 76 percent suitable habitat and 14 percent suitable denning habitat within the Timothy LAU is that these lands will likely provide productive, connected lynx habitat. As a result, habitat within the Timothy LAU is expected to continue to contribute to the conservation of Canada lynx (Ruediger et al. 2000).

The incorporation of objectives, standards, and guidelines into the Umatilla forest plan specific to Canada lynx is specific to the purpose and need and actions in the alternatives for the Lower Sheep project only. This amendment will not preclude or require other amendments specific to lynx and this amendment will not preclude or require other actions across the forest in lynx habitat. For example, the incorporation of this management direction will not affect the amount of timber made available for public use outside this project area nor will there be changes in livestock grazing permits or plans of operations for mining. This amendment will not change or require future changes to the access and travel management plan for the Ranger District.

Cumulative Effects Common to Alternatives B, C, and E

Past and current projects within the Timothy LAU created some unsuitable lynx habitat. About 400 acres (approximately 1%) of foraging habitat was logged in the Grande Ronde Salvage and the Sheep Salvage Sales. The effects of past and current livestock grazing on lynx habitat are already reflected in the current habitat conditions in Table 4-23. Private lands within and adjacent to the planning area continue to see logging activity. Private lands are not currently providing suitable lynx habitat and are not included in the LAU acres. Possible cumulative effects to lynx habitat are slight, considering the proximity and amount of private land.

The effects of ongoing public uses in the area such as camping, hiking, hunting, fishing, ATV and motorcycle riding, mountain biking, and firewood collection generally occur in the daytime. About 14 miles of existing snowmobile trails within the Timothy LAU are regularly groomed, and the Lower Sheep project could add 15-20 more miles of compacted snow. Not all roads would be plowed at the same time for timber harvest, and these roads do not connect to the snowmobile trail system. Since there is an abundance of lynx habitat in surrounding areas that could serve as refugia from these impacts cumulative effects from snow plowing are not expected. The impact of these current and other past actions to lynx habitat is reflected in the baseline existing conditions (Table 4-23 and Chapter 3).

Foreseeable future actions within the LAU include planting old clearcuts that are currently unsuitable lynx habitat, and protection of aspen stands. These projects could eventually add about 300 acres of habitat suitable for lynx foraging.

The Forest Plan, as amended requires that no more than 15 percent of lynx habitat within an LAU be changed to unsuitable condition within a 10-year period, beginning in the year 2000. About 400 acres (approximately 1%) of foraging habitat was logged in the Grande Ronde Salvage and the Sheep Salvage Sales. The effects of these projects are included in the baseline condition. Alternatives A, D, and E would not add to the cumulative reduction in suitable lynx habitat. Alternatives B and C would reduce suitable habitat by a slight amount (2% and 1%), but the total would still be well within the 15 percent standard.

Cumulative mortality of individual lynx is not expected because the Lower Sheep project does not propose any activities identified as mortality risk factors (trapping, shooting, predator control, and highways) and there is no resident lynx population.

The cumulative effect of maintaining 74 to 76 percent suitable habitat, and 14 percent suitable denning habitat within the Timothy LAU (Table 4-24), is that these lands will likely continue to provide productive, connected lynx habitat. As a result, habitat within the Timothy LAU is expected to contribute to the conservation of Canada lynx (Ruediger et al. 2000).

Because the amendment only applies to lynx habitat within the Lower Sheep project area for the duration of that project, there are no other required changes in the forest plan or required actions across the forest in other areas within lynx habitat. The incorporation of this management direction will not cumulatively affect the amount of timber made available for public use nor will there be changes in livestock grazing permits or plans of operations for mining in other areas of the forest because there are no direct and indirect impacts to these resources anticipated. This amendment will not change or require future changes to access and travel management plans. All other cumulative effects of amending the forest plan for lynx are as described for direct and indirect effects.

The desired and expected programmatic cumulative effects of those reasonable foreseeable amendments added to the Lower Sheep amendment is suitable habitat within affected lynx analysis units continue to provide productive, connected lynx habitat. As a result, habitat within the affected lynx analysis units is expected to contribute to the conservation of Canada lynx (Ruediger et al. 2000).

Effects Unique to Alternative B

Mechanical harvest would occur in 608 acres of lynx habitat (Table 4-22), comprised of 77 acres of denning habitat, 520 acres of foraging habitat, and 11 acres of unsuitable lynx habitat. This would result in a 2 percent reduction of suitable habitat for lynx (Tables 4-22, 23 and 24).

The effect of maintaining 74 percent suitable habitat and 14 percent suitable denning habitat within the Timothy LAU is these lands are expected to contribute to lynx productivity and connectivity within the Timothy LAU. Direct or indirect mortality of individual lynx are not expected because a resident population is not present and the Lower Sheep project does not propose any activities identified as

mortality risk factors. Because of these effects habitat within the Timothy LAU for Canada lynx is expected to contribute to the conservation of Canada lynx (Ruediger et al. 2000).

Effects Unique to Alternative C

Mechanical harvest would occur in 330 acres of lynx habitat, comprised of 20 acres of denning habitat, 300 acres of foraging habitat, and 10 acres of unsuitable lynx habitat. This would result in a one percent reduction of suitable habitat for lynx (Tables 4-23 and 4-24).

The effect of maintaining 75 percent suitable habitat and 14 percent suitable denning habitat within the Timothy LAU is these lands are expected to contribute to lynx productivity and connectivity within the Timothy LAU. Direct or indirect mortality of individual lynx are not expected because a resident population is not present and the Lower Sheep project does not propose any activities identified as mortality risk factors. Because of these effects habitat within the Timothy LAU for Canada lynx is expected to contribute to the conservation of Canada lynx (Ruediger et al. 2000).

Effects Unique to Alternative E

Mechanical harvest would occur in 84 acres of lynx habitat, comprised of 74 acres of foraging habitat, and 10 acres of unsuitable lynx habitat. Although Alternative E would cause a change of 74 acres of suitable habitat to unsuitable, a change in the ratio-percent of suitable/unsuitable habitats within the Timothy LAU does not result (Tables 4-23 and 4-24). Because this change is small, there would be little if any measurable or practical effect to the overall lynx habitat within the LAU.

The effect of maintaining 76 percent suitable habitat and 14 percent suitable denning habitat within the Timothy LAU is these lands are expected to contribute to lynx productivity and connectivity within the Timothy LAU. Direct or indirect mortality of individual lynx are not expected because a resident population is not present, and the Lower Sheep project does not propose any activities identified as mortality risk factors. Because of these effects, habitat within the Timothy LAU for Canada lynx is expected to contribute to the conservation of Canada lynx (Ruediger et al. 2000).

Other Species of Interest:

Environmental Consequences Unique to No Action

Direct and Indirect Effects

There would be no direct or indirect effects on any bat species. Large snags used by these species for roosting, and the quality, quantity, and distribution of suitable habitat would not be affected in the short-term. There would likely be an increase in snag habitat for bats in the long term, due to increased incidence of insects and disease. In the short term (20 years), there would be no direct or indirect effects on the northern goshawk, prairie falcon, or golden eagle. The quality, quantity, and distribution of suitable habitat for these species would not change. Over the long-term (>20 years), multi-strata stands would continue to develop, enhancing their value as nesting habitat for goshawk. Habitat for Neotropical migratory birds and other land birds that are dependent upon open, single-stratum stands and understory shrubs could decrease in the future due to continued fire exclusion, increased stand densities, and fewer acres of open single-stratum stands. Many of the land bird priority habitat types (Altman 2000) would have an ever-increasing risk of habitat loss from wildfire. A major disturbance on the landscape could change the composition and structure of the area to an open shrubland/grassland with little or no tree cover. If a wildfire occurred, these stands could convert to non-suitable habitat for most of these species.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect Effects

Implementation of proposed activities could affect bat roosting habitat. Snags would be felled under all of the action alternatives to some degree, with the most snags removed under Alternative B because more

acres are proposed for harvest. At the watershed scale, the effect on bat roosting habitat would be the same as the effects on primary cavity excavator habitat, which is minimal considering the availability of habitat in the watershed. Forest Plan standards for snags would be met following harvest. The largest trees and snags in treated stands would be retained (unless a safety hazard), which would provide some future roosting habitat. The overall 1 percent reduction in snags would not impact populations though use of the landscape would change because of the reduction of snags in the harvest units.

Commercial harvest and fuels treatments could change habitat conditions for prey species of the prairie falcon and golden eagle. In the short term, burning grassy areas would reduce the number of small birds and small mammals that these species hunt for. Later in time, these habitats will be enhanced when grasses and shrubs respond with increased vigor following fire. Commercial harvest and fuels treatments would reduce some nesting habitat for the northern goshawk because microhabitats would be altered. Generally, the large trees preferred for nesting will remain in harvest units, and foraging habitat will remain plentiful outside of harvested areas. No goshawk nests have been observed in the planning area, so the potential for disturbance during nesting is quite low. If a nest were encountered prior to or during treatment activities, the nest site and surrounding area would be protected according to standards in Regional Forester's Forest Plan Amendment #2.

Habitat for Neotropical migratory birds and other land birds that are dependent upon open, single-stratum stands and understory shrubs would slightly increase with thinning and fuels treatments. Thinning in late successional mesic mixed conifer habitat would reduce stand densities and decrease canopy cover, but this would also stimulate growth in ground cover and shrubs. Most stands would retain their current multi-storied structure. In general, old growth characteristics would be enhanced, and stand composition and structure would more closely resemble what was historically present. Montane meadow and riparian habitat will not be affected by proposed activities. Landscape prescribed fire in the fall would not directly affect ground nesting birds. Risk of habitat loss due to a large-scale or high severity wildfire would be reduced for all bird habitats because of thinning and fuels treatments. Underburning would remove some shrubs, grasses, and seedlings from the understory, which would temporarily reduce cover for birds and decrease foraging habitat. However, in the year following burning, grasses, forbs and shrubs would re-occupy the burned area. Jackpot burning and slash-busting (mastication) in harvested stands during springtime could affect a very small number of birds, because bird use of these areas immediately after harvest would probably be low.

Cumulative effects

Commercial thinning and harvest of diseased or insect/dwarf mistletoe-infested trees would remove some snags, adding to the cumulative snag reduction in the analysis area resulting from past harvest. However, snag numbers would still meet Forest Plan standards in treated stands.

Environmental Consequences Unique to Alternative B

Direct and Indirect Effects

Alternatives C, D, and E are fairly close in acreage, while Alternative B would affect an additional 3 percent of the planning area. An additional 722 acres would be entered for harvest treatments compared to Alternative D. Bats and some bird species could be slightly more affected under this alternative, but the overall impact to populations and habitat would be similar at the watershed scale. Alternative B would affect the most potential habitat for the northern goshawk. Since no nest territories have been located, the potential for direct disturbance is low. Large trees that could be used for nesting would be left. In the long term, stand composition and structure would more closely resemble what was historically present, and the forest would be more resilient to disturbance. The effects of jackpot burning, slash-busting (mastication) and landscape burning would be the same as that described for all action alternatives.

Timber

The Forest Plan states the following goal: *Provide for production of wood fiber consistent with various resource objectives, environmental constraints, and considering cost efficiency.*

The Forest Plan established Management Areas to accomplish various resource management objectives.

Table 4-25. National Forest Land Management Areas within the Lower Sheep Analysis Area

Management Area	Abbreviation	Acres
Viewshed 2	A4	324
Wild and Scenic Rivers (Amendment 7 Wallowa & Grande Ronde Rivers Final Management plan/Environmental Assessment)	A7	1,319
Scenic Area	A8	3,096
Special Interest Area (Lookout Mountain)	A9	193
Dedicated Old Growth	C1	206
Wildlife Habitat	C4	8,952
Riparian	C5	1,612
Timber and Big Game	E2	8,198
Total Forest Service		*23,900*

All management areas except A9 and C1 allow timber harvest. *The selected silvicultural systems will be guided by the following criteria (see pages 4-67 and 4-68 of the Forest Plan):*

- *Selected method must produce a volume of marketable trees.*
- *Selected method must use available and acceptable logging methods.*
- *Selected method must be capable of meeting special management and multiple-use objectives.*
- *Selected method must permit control of vegetation to establish desired species composition, density, and rates of growth.*
- *Selected method must promote stand structure and species compositions that minimize risks from insects, disease, and wildfire.*
- *Selected method must assure that lands can be adequately restocked.*
- *Selected method must be practical and economical in terms of transportation, harvesting, preparation, and administration of timber sales.*
- *The planning area is in the North Associated Group; strong consideration should be given to maintenance of stands dominated by early successional species including ponderosa pine, Douglas-fir, western white pine, and western larch.*

Summary of Existing Condition

- Scheduled Harvest is permitted on 23,501 acres.
- Harvest has occurred on approximately 37 percent of the planning area. Regeneration harvest has occurred on approximately 28 percent of the planning area making up 76 percent of the past harvest.
- Limits to sustaining wood production include 1) Stands in the planning area have departed from historic vegetation conditions and have become overstocked with shade tolerant tree species; 2) Ladder fuels loading could lead to stand replacement wildfire events not characteristic of the

historical fire regime; and 3) Increased amounts of grand fir in the species mix have increased the risk of extensive damage from defoliating insects, root rots, and fir engraver

Alternative A - No Action

Direct and Indirect Effects

The No Action Alternative does not support the goals and objectives for timber production as permitted by the Forest Plan. The build up of fuels and complexity of structure places the Grande Ronde Canyon and the rim at risk for a stand replacement wildfire. When a wildfire comes out of the canyon the complex fuel loads above the rim places the interior private land at risk for a catastrophic fire. Within the canyon and along the rim high severity wildfires can be expected on the landscape that historically were low severity. The fuel conditions and associated risk for stand replacement wildfire is expected to increase over the landscape. Without silvicultural treatments early seral species would not regenerate. Crown closure would inhibit regeneration of ponderosa pine and western larch. A wildfire could kill extensive areas of overstory, particularly large trees, such that a natural seed sources would be too distant to reestablish trees. The overstocked condition increases the risk of insect infestation. Root rot pockets will increase because shade tolerant species are the most susceptible species. No actions would occur that increase forest health or resilience to disturbance events such as wildfire, insects, or root rots. The resilience provided by early seral species would continue to be lost from the landscape.

Marketable volume of trees would be lost when the larger diameter trees die from insects and disease and are not utilized. The large diameter trees are the highest risk for insect attacks. Multiple-use objectives would not be met; habitat would become more uniform in structure and composition, forage for big game would be reduced, marketable volume would not be utilized, and the risk of a catastrophically altered landscape would continue to increase. The current stocking would produce more cubic feet of volume than thinned stands, however, the trees would remain small. Overall there would be a loss in potential diversity which could reduce the attainment of resource goals and objectives.

Effects Common to All Action Alternatives

Timber harvest is proposed in Forest Plan Management Areas C4 and E2 only. Landscape prescribed fire would occur in A7 and A8

Direct and Indirect Effects

All action alternatives would produce marketable volume that would meet utilization standards. They all reduce stocking levels, increase growth and vigor, and produce future merchantable trees. Alternative B would harvest 9,853 mbf; Alternative C, 6,244 mbf; Alternative D, 5,948 mbf; and Alternative E, 5,748 mbf. The proposed logging systems, cut to length and skyline or helicopter, have been used on the district in the past and are easily available. These systems provide acceptable resource protection with much lower impacts than conventional ground systems.

The following table presents the changes that would result from harvest treatments, with the objective of increasing resilience to disturbances in the treated stands by reducing stocking levels and fuels, increasing the percent of early seral tree species in the overstory, and maintaining horizontal and vertical diversity.

Table 4-26. Summary of Treatment Results and Acres to be Planted

Alt.	Volume mbf	Gross Harvest Acres	Net Harvest Acres	Density Reduction & Fuels Reduction (HITH, HSEI)	Regeneration (HSSW, HSST) and net HSEG	Disease Reduction (HIIM)	Acres to be Planted
B	9,853	1,812	1,682	1,492	108	82	86
C	6,244	1,208	1,175	1,088	62	25	61
D	5,948	1,090	1,074	944	70	60	70
E	5,748	1,108	1,064	915	77	72	76

Stocking level objectives would be the same for each alternative. In most cases, the stocking level recommended is in the lower half of the management zone for the stand's plant association. This allows early seral trees to be competitive with late seral trees in the stand, and gives the stand time to grow before it again reaches an overstocked condition.

The early seral tree species and lower stocking levels would reduce the risk of large-scale mortality from insects, disease and wildfire in both the frequent and mixed fire regimes. Prescriptions favor the increased dominance of ponderosa pine and western larch. These species and proposed stocking levels promote the landscape's resilience to disturbance. Tree vigor would increase providing protection from insects. Fire resistant species would increase over the landscape providing a large tree component that would survive fires. Removal of smaller trees within 35 feet of large early seral trees would protect the larger trees.

The proposed prescriptions and harvest methods would meet Forest Plan Standards and Guidelines and multiple-use objectives. A prescribed fire program benefits mushroom and forage production for big game and big horn sheep within the Grande Ronde Canyon. Thinning opens tree canopies, increasing herbaceous vegetation for forage used in common with cattle and sheep. No harvest or related activities are proposed within RHCAs. Water quality and fisheries habitat would be protected.

Stocking level control by thinning would allow trees to grow faster and larger, and would move the stands into more advanced structural classes at an earlier age. In the future the larger trees would produce higher quality fiber providing more uses than trees from overstocked stands.

On the majority of past harvest units in this area there have been no problems with reforestation and regeneration units have reforested within the required 5 years. There have been reforestation problems on parts of some of the large clearcuts that were cut before 1980. A primary cause of reforestation difficulty was heavy seeding with aggressive non-native grasses. Current information about these grasses from the NRCS cautions against planting them on high productivity sites, as they are persistent and choke out all other vegetation once established. No non-native grasses or forbs would be planted. Native grass seed of local origin has been collected and propagated and is available for sowing where needed according to BMPs. The harvest systems used at that time created much heavier soil impacts than current harvest systems, and the lack of residual overstory created harsh conditions that contributed to delayed reforestation.

Group selection prescriptions create small openings within stands that would mimic small scale disturbance events like root rots and patch kills from insects. The stands would have an unevenaged appearance. There are a few acres of regeneration harvest proposed; shelterwood (HSSW) and seedtree (HSSW/HSST) prescriptions. The residual overstory would be left at the following levels on the stand regeneration units and retained for future snags:

Table 4-27. Leave Trees in Regeneration Units

Stand Regeneration Prescriptions	Minimum tree per acre left after harvest	Alt. B, D, E Acres	Alt. C Acres
Shelterwood	12 to 15	53	42
Shelterwood/seedtree	6 to 12	6	6

The uneven-age managed stands would have a mosaic of age classes. Grass and shrubs would contribute a larger share of site productivity than current conditions. Fire disturbance processes or harvest would keep the stands in open conditions, producing larger trees and less cubic volume than would be produced by even aged management.

Cumulative Effects

All action alternatives provide for varying degrees of multiple uses while meeting the goals of the Purpose and Need. Specific effects to resources are discussed in other sections of this chapter. Resource protection is provided through various management requirements, the logging systems, and fuel ignition standards. Forwarders, skylines, and helicopters have low impacts to soil and water quality and the no harvest or ignitions within RHCAs provides additional protection and maintains riparian functions. RHCAs would be allowed to continue developing under the current conditions, those with high mortality from insects would be at risk for catastrophic wildfire, but effects would be buffered by the fuel reductions occurring adjacent to them. Management requirements for Fish and Water Quality, Wildlife, Control of Logging, Noxious Weeds, and Prescribed Fire should be effective in reducing impacts to these resources.

Multiple-use benefits include:

- Improved stand vigor, growth, and resilience to insect attack and wildfire by thinning the stands, also protection of multiple resource values for wildlife. Total acres treated: Alternative B, 1,492 acres; Alternative C, 1,088 acres; Alternative D, 944 acres; and Alternative E, 915 acres.
- Increased fire fighter safety by reducing surface and ladder fuels and increasing the ease to control a wildfire.
- Increased success of taking suppression actions along the private land boundary from the modified fuel and stand structure along the Forest boundary. Acres treated within half a mile of private land: Alternative B, 1,206; Alternative C, 802; Alternative D, 913; and Alternative E, 1,025.
- Improved road drainage and public safety.
- Maintenance of landscape habitat diversity by reducing fire intolerant tree species from the understory and beginning the restoration of the frequent fire regime inside the Grande Ronde Canyon and along the rim.
- Protection of large trees using thinning to increase their resilience to insects, disease, and fire.
- The YUM of cull material would be available for firewood.

Transportation System

The Forest Plan states the following Goal: *Provide and manage a safe and economical road and trail system and facilities needed to accomplish the land and resource management and protection objectives on the Umatilla National Forest.*

Alternative A - No Action

Direct and Indirect Effects

Road maintenance on closed roads, culvert replacement and new installations, and surface rock replacement would not occur. These improvements are needed for public safety, drainage improvements and prevention of future damage. Drainage related problems would not be corrected until an event occurs that causes a failure with associated resource damage, particularly water quality. Improvements not made at this time would add additional costs in the future, and be more costly because of the increased potential for damage. This area is low risk and does not have a history of fill or cut slope failures however old culverts exist and many areas carry water on the road surface. These problem areas would not be improved.

Cumulative Effects

Not replacing the surface rock increases the potential production of sediment. Forest Road 6231 is a major access and travel route through the District. Traffic is moderate and the surface rock keeps the road from rutting and holds the surface for safer travel. No action would continue existing problems and perpetuate degrading road conditions that would impact water quality.

Effects Common to All Action Alternatives

Table 4-28. Proposed Temporary Road Construction by Alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Miles of temporary road construction	0	2.0	.7	1.0	1.5

Direct and Indirect Effects

Up to 2.0 miles of temporary roads would be constructed for short-term access to four proposed harvest units. These roads would be used during the harvest activity (approximately a month for each road) and decommissioned after use. They would be allowed to revegetate after use. The roads are located on ridge tops, as for the access of skyline unit 30, or cross flat bench areas to access forwarder units. The temporary roads are distant to streams or intermittent drainages and would not impact water quality. Impacts to water quality from harvest related actions are immeasurable. Temporary road impacts to biodiversity and wildlife are no different than timber harvest and are short-term, less than 20 years. The road surfaces would become vegetated and be similar in appearance to the harvest units. A 12-foot wide road surface does not fragment stands because the vegetation reestablished would be similar to the understory vegetation as the rest of the stand and the reduction in crown closure would not be noticeable from the prescription for the stand. Since the temporary road would likely not be used for another 20 to 40 years, there would be no impacts from additional traffic into the area and any trees growing on the road surface would reach sapling stages and provide understory habitat. The access and travel management plan would be unchanged.

There is surface rock replacement proposed for three roads in the analysis area. Forest Road 6200 is proposed for 1.75 miles of surface rock replacement, Forest Road 6235 is 1.23 miles and Forest Road 6231 is 4.70 miles. The proposed 56.33 miles of road maintenance would also improve drainage. When hauling is completed, the closed roads would be self-draining with additional cross drains. Replacement

of surface rock and improved drainage, reduces maintenance costs and potential sediment production from these non-point source sites, and improves user safety.

See the Hydrology and the Riparian and Fish Habitat sections for effects on those resources.

Cumulative Effects

There are no changes to the access and travel management plan. Access to various points in the area does not change. Fire control and access by grazing permittee would not change. Current recreational use would not be impacted. There would be a short-term, 1 to 3 month, increase in road density until the roads are decommissioned.

Wild & Scenic Area

Grande Ronde Wild and Scenic River Corridor and the Forest Plan A8-Scenic Area

The Forest Plan state the following goal: *Manage classified wild and scenic river segments to appropriate standards as wild, scenic, or recreational river areas, as defined by the Wild and Scenic River Act;* and for A8; *Protect or enhance the unique natural characteristics of landscapes noted for their scenic beauty.*

Impacts to the wild and scenic river corridor will be discussed for both the corridor and for Forest Plan Management Area A8 – Scenic Area above the corridor. They are connected for the recreational experience along the river because the landscape designated as A8 contains much of the canyon view that provides the primitive experience. Information from the *Wallowa and Grande Ronde Rivers Final Management Plan/Environmental Assessment* of December 1993 (FMP EA) identified the following Outstanding and Remarkable Values: Wildlife, Fisheries, Recreation, and Scenic Values.

Alternative A - No Action

The existing condition would continue to function with effects to wildlife, fisheries, recreation, and scenic values being unchanged. The dry forest type makes up the majority of the forested landscape within the canyon and has transitioned to complex fuel conditions represented by condition class 2. This condition places the landscape at risk for catastrophic damage within the timbered stringers and RHCAs when a wildfire occurs within the canyon. A wildfire would spread quickly through the grasslands spreading fire to multiple locations in the timber stringers. The area burned would be more extensive than that from a prescribed fire with higher levels of mortality. Wildfire is a natural occurrence on this landscape and though it would have higher visual impacts; it is something expected and would be compatible with the management and outstanding values of the wild and scenic river.

Effects Common to All Action Alternatives

The outstanding and remarkable values are described here along with impacts.

Wildlife: A detailed analysis of the impacts of prescribed fire on wildlife can be found in the Wildlife section of this chapter. The Wild and Scenic River Corridor is noted for providing winter habitat for bighorn sheep, elk, mule deer, whitetail deer, and bald eagles. The area would continue to provide habitat for these species. The use of prescribed fire would improve habitat conditions by rejuvenating brush and grassland vegetation. Some snags would be burned and fall to the ground, however, green trees would also be killed and replace snags that would fall from fire damage.

Fisheries: A more detail analysis can be found in the fisheries and hydrology section of this chapter. This portion of the Grande Ronde River is mainly a migratory route for indigenous and ESA listed resident and anadromous fish. The lower reach of Sheep Creek is used as spawning habitat by Snake River steelhead trout. The fall burning of the area above Sheep Creek would generate immeasurable sediment into the stream and occur at a time when steelhead are not spawning. Winter and spring flushes of the streams would occur prior to spring spawning. Anadromous fish do not spawn or rear in this

section of the main Grande Ronde because of high water temperatures. The project would be consistent with the Clean Water Act because Best Management Practices and other project design features would reduce impacts to water quality. The prescribed fire would not impact fisheries values; quality fish habitat would be retained.

Recreation: Surveys from the late 1980s show that 84 percent of the visitors to the river are from outside northeast Oregon and 22 percent from outside the tri-state region of Oregon, Washington, and Idaho. The primary recreational use is floating and organized concessionaire rafting mostly in the spring and early summer before the water level get too low. The river provides 2 to 5 day duration, primitive float experience for individuals and groups with beginning and moderate skill levels. The experience offers a feeling of remoteness through a pleasingly diverse landscape. There are no trails in this portion of the river and access is very arduous. The primary means of accessing the area is the river itself.

The prescribed fire would have a short-term, 1 to 2-year, impact on scenic values but not affect the ability to float the river. Some people may be distracted by the burn during the first year after the fire but would not impact the long-term use of the river as a destination for floating. The proposed prescribed fire would occur in the fall when the water and use is low. Smoke may reduce the quality of the experience for the few individual floaters but it is also short term lasting several days. The ability to provide primitive and remote recreational experience would remain.

Scenic Values: This portion of the Grande Ronde River contains a diversity of landforms and vegetation that captures the attention of the viewer floating the river. Vegetative color is enhanced by climate change and seasons. Much of the landscape is forest stringers separated by grasslands on very seep slopes maintained by a frequent fire regime. This portion of the river offers a primitive experience within a largely untouched scenic viewshed.

The only view into the river canyon from the canyon edge is near the confluence of Sheep Creek from FR 6234040 and FR 6235040 at the southern tip of the planning area. Both roads are seasonally open under the access and travel management plan and are used during hunting seasons. The topography limits the view to Sheep Creek Canyon and eastward across the Grande Ronde canyon with minor distant views of the Grande Ronde south of the planning area boundary. The road system above Fuel Reduction Area 8, Forest Roads 6230, 6234050, 6243052, and 6234054, do not have viewpoints into the canyon. The next major viewpoint into the canyon is north of the planning area above Alder Creek near Lookout Mountain, which does not view the slopes proposed for burning.

Scenic Quality

Direct and Indirect Effects

Landscape prescribed fire is the only activity impacting the vegetation within the Wild and Scenic corridor and the canyon lands above it. The limited timber harvest near the edge of the breaks would not be noticeable from the river because the units would be thinned and the forest texture change unnoticeable along the rim, a quarter mile above the Wild and Scenic River Corridor and half mile from the river. The primary focus of the river user is the foreground so an activity along the rim is not likely to be noticed. Someone sitting at a camp along the river may observe the thinned stand, but it would not detract from the visual experience because it would blend with the forested landscape patterns. Experience with thinning when viewed at this angle indicates it would not be seen. The fire would not impact the diversity of landforms; forestland would remain forestland and brushlands and grasslands would be regenerated. Geologic landforms would be unchanged.

Fuel Reduction Areas 4, 6, and 8 fall within the visual range of the river. Only Fuel Reduction Area 8 includes the Wild and Scenic corridor: the other two areas are along the rim and upper slopes of the canyon. The proposed fall ignitions would occur primarily in the grasslands and brush fields outside of RHCAs and allowed to back into the RHCAs. In the timber stringers, outside the RHCAs, the ignitions would produce a patch mortality effect caused by spot ignitions of fuel concentrations. Where light fuel

loads occur, strip ignitions would be utilized. Vegetative impacts from the prescribed fire would be short-term (one year at most two years) until grasses, brush, and herbaceous species recover the landscape. Dead trees, particularly small trees (saplings to poles) would be evident over a 5 to 10-year period. Few overstory trees are expected to be killed. Portions of the landscape within the Wild and Scenic corridor would have a blackened appearance during the winter and early spring. By the time users are on the river, the burned grass areas would be sprouting brighter green than unburned areas because of nutrients released by the burn. Brush fields would be evident by the relic dead, blackened, wood but sprouts would be greening the area and by mid summer much of the blackened area would show recovery. The burn would be evident as the recovering vegetation reduces the visual effects the first year and would become less evidence in following years.

Since ignitions would be outside Riparian Habitat Conservation Areas (RHCAs) the foreground near the river would be nearly unchanged; only the occasional backing fire would burn into the 300-foot wide RHCA. River edge vegetation would still be present to screen much of the burn area. The fire would likely be more noticeable along the face of the canyon, but not a dominant landscape feature by mid summer the year after the burn.

Vegetation that brings seasonal changes to color and texture would still be present. The diversity of vegetation would remain. Western larch would still be seen along the upper rim of the canyon. Even though brush fields would be burned, the renewed growth and vigor of the sprouts would provide fall color. The hardwoods along the river and within the RHCA would also be present. By the end of the second year the evidence of the burn would likely be gone.

Fire is a natural occurrence on this landscape. Even though a prescribed fire is a management action the landscape within the wild and scenic corridor and in the viewshed above would still have an untouched appearance. The landscape would have a burned appearance but not as severe as a wildfire under current fuel conditions. The canyon area is transitioning to more complex fuel conditions that would cause severe visual impacts due to mortality in the small to large tree size classes. The prescribed fire would reduce the intensity and severity of a wildfire such that the landscape would be more resilient and better able to maintain the forest-grassland mosaic appearance.

Cumulative effects

Past logging activities are visible but distant from the viewer along the river and since the past logging occurs along the canyon break they are not visually apparent. The few older clearcuts that come over the edge have become plantations and are visually subordinate on the landscape. All harvest activities, including the proposed harvest, are distant to the river, from a half to a mile. Past harvest would not have any visual cumulative effects with the proposed harvest. All past and proposed harvest would blend into the background landscape.

Past activities to the north of the planning and within the Wild and Scenic corridor include wildlife prescribed fire in Bear Creek to Elbow Creek used to rejuvenate forage. Above the canyon rim commercial thinning east of Elbow Creek was used to restore open ponderosa pine communities. Over the next few years there would also be prescribed fire used within the canyon east of Elbow Creek. The thinning is not noticeable from the river and the wildlife burn from the mid 1990s has healed over and is no longer seen. In the late 1980s there was a wildfire north of the Lower Sheep Planning Area that burned along the canyon face onto Eden bench. This fire was visible for many years because it killed several thousand acres of forest. It is no longer a dominant feature on the landscape because snags have fallen and vegetation has become established, greening the slope. Past prescribed burning indicates that effects are short lived and that wildfire affects to visuals can last up to ten years shifting from a blackened landscape to a relic of dead standing trees. The new ignitions in the Lower Sheep Area would not cover the whole landscape in a single burn and would likely take two to four burn entries. This would reduce the visual impacts and since past burns outside the planning area have already recovered, there would be no cumulative effects to visuals along the length of the Wild and Scenic River. The proposed future

burning in Elbow Creek is distant (approximately 9 miles) from the Lower Sheep Area and visually not connected because of multiple bends in the river.

Consistency with the Wallowa and Grande Ronde Rivers Final Management Plan

The proposed prescribed fire is consistent with the Final Management Plan and the Wild and Scenic River Act. Prescribed fire was identified as a compatible activity within the Wild and Scenic River corridor. Outstanding and Remarkable values are being preserved. Though the burning would impact visual quality it would last a short time and is of a nature that would be expected on the landscape. The method of ignitions would reduce the amount of mortality to small and large tree size classes. Patch kills would likely be less than 5 acres in size with occasional openings up to 10 acres. The reduced fuel loads and reduction of small (sapling size) trees is consistent with the vision to protect and/or enhance the physical, biological, … and other special qualities that give the free-flowing Grande Ronde River unique character… by increase landscape resilience to wildfires and increasing forage quality for big game.

Oregon State Scenic Waterways Program

The Oregon Scenic Waterway Act was established by ballot initiative in 1970. The scenic waterways program promotes cooperative protection and wise use of rivers in the system by all agencies, individual property owners, and recreation users. Program goals include:

- To protect the free-flowing character of designated rivers for fish, wildlife, and recreation.
- To protect and enhance scenic, aesthetic, natural recreation, scientific, and fish and wildlife values along scenic waterways.

To encourage other local, state, and federal agencies to act consistently with the goals of the program. Oregon State Parks reviews plans and decisions made by other agencies to ensure consistency with the scenic waterways program. The District has notified the State about the proposed project.

Oregon Administrative Rules determined the management direction for this portion of the Grande Ronde River. OAR 736-40-040, Classification of Scenic Waterways and Segments has classified this portion of the Grande Ronde as a Natural River Area. "Natural River Areas will be administered to preserve their natural, wild and primitive condition, essentially unaltered by the effects of man, while allowing compatible recreation uses, other compatible existing uses, and protection of fish and wildlife habitat." Management activities within the Wild and Scenic River Corridor are guided by direction in OAR 736-40-035, Oregon State Scenic Waterway Rules of Land Management. This rule talks about timber harvest and improvements associated with development of lands. FMP EA pages 80 to 89; 223 to 227

Consistency with the Oregon Scenic River Program

There is no timber harvest proposed within the Wild and Scenic River Corridor; prescribed fire is the only management activity being proposed within the corridor. Three of the proposed timber harvest units are along the break in slope into the canyon. The proposed harvest units would boarder approximately 1 mile of 7.5 miles of the canyon rim within the planning area above the Wild and Scenic River Corridor. The proposed thinning would be unnoticed from the river and over a quarter mile from the Wild and Scenic River Corridor or half mile from the river.

The proposed prescribed fire uses a natural landscape process that would be compatible with the goals to preserve natural, wild and primitive conditions. It will maintain vegetation and forest resilience, improve big game forage, and be observable as middle ground for 1 to 3 years depending on vegetation type (grasses, brush, or forestlands) and how long it takes trees to die and lose their needles. The small patches of killed trees are not expected to be noticeable from the river and would fit the natural mosaic of timber and grasslands. The proposed prescribed fire would be consistent with the Oregon Scenic River Program.

Roadless Area

Grande Ronde Inventoried Roadless Area: Approximately 4,700 acres of the 17,600 acre inventoried roadless area is within the Planning Area. The Oregon Natural Resource Council indicated that there was 1,000 acres of unroaded area adjacent to the Roadless Area in Sheep Creek. Our maps indicate that much of the area is already within the Grande Ronde Inventoried Roadless Area boundary. The Grande Ronde Inventoried Roadless Area was allocated Grande Ronde Wild and Scenic River Corridor, Forest Plan Management Area A7 and Forest Plan Management Area A8-Scenic Area. Management Areas C4-Wildlife Habitat and C1-Dedicated Old Growth are found along the rim. Only fuel reduction activities involving landscape prescribed fire and hand piling and burning would take place in the Roadless Area: there would be no timber harvest or road building. Impacts to roadless character identified in the Forest Plan, Appendix C – 100 to 111, are disclosed below.

Alternative A - No Action

Direct and Indirect Effects and Cumulative Effects:

There would be no change to the landscape character, scenic integrity, and primitive experience. The landscape would continue developing complex fuel loads. Most of the landscape is already displaying the character of condition class 2 having missed several fire return cycles. The timbered stringers with the grass/tree mosaic are at risk to catastrophic damage under a wildfire scenario. A wildfire would have a more extensive burn and kill more trees. There would be higher impacts to visual quality caused by a wildfire compared to a prescribed fire however it would be a natural occurrence and expected condition of the landscape. The general landscape character would be unchanged; it would still be able to provide a primitive experience. A wildfire would likely produce higher quantities of sediment into the Grande Ronde because of hotter burns within RHCAs but would not have a measurable impact on the survival of ESA listed fish species because this area is used primarily as a migratory route. Spawning and rearing habitat is limited in this section of the river because of warm waters.

Effects Common to All Action Alternatives

Direct and Indirect Effects

Landscape Character and Scenic Integrity: The proposed landscape prescribed fire would have little to no impact on landscape character and a short term (one to two year) impact to visual quality and up to ten years for trees killed by the fire to fall to the ground. The steep slopes covered with grass or mosaic of grass and conifers interspersed with basalt outcrops would remain the landscape features of the canyon. The fall burn would occur at a time when use of the river is low. The fire would blacken grasslands and brush however the grasslands would green by spring. Brush fields would take longer, two to three years, to show recovery because relic dead wood would take longer to be covered by the regrowth of the vegetation. By the end of the first year the landscape would have a general vegetated appearance with patches of dead brush and trees visible on the landscape. These patches of dead would be middleground along the face of the canyon and generally not noticed from the river. The burned landscape would fit with expected ecological disturbances typical for the canyon ecosystems only it would not be as extensive or severe as what would occur with a summer wildfire.

Primitive Experience: The landscape prescribed fire proposed by the Lower Sheep project would not impact the primitive experience of river users. Fire is a part of the natural disturbance processes in the canyon and would be subordinate to the landscape features within five years. Other than impacts related to fire severity, it would be hard to tell the difference between the human ignited fire and a wildfire. There are no new trails, timber harvest, or roads proposed within the roadless area so the opportunity for a primitive experience would be retained. There would be no change in the ability of a float trip to provide a sense of solitude and a feeling of remoteness in a landscape where evidence of human management actions are subordinate to landscape features.

Habitat for threatened and endangered species: The landscape prescribed fire would not impact the use of the river by migratory fish or bald eagles. Ignitions would not occur within Riparian Habitat Conservation Areas, RHCAs, however, fire would be allowed to back into the RHCA. There may be occasional fire that creeps into the RHCA and burns to the edge of the Grande Ronde River but this would be less than 5 percent of the RHCA. Since fish do not rear or spawn in this section of the river and sediment input from the prescribed fire would be immeasurable, the current use of the river as a migratory route for fish would be unchanged and not impacted. Bald eagle would also be able to continue winter use of the river without impacts; the prescribed fire would create roost trees and not impact available winter forage species.

Visual Quality

The goal for Forest Plan Management Area A4 is: *to manage the area seen from a travel route, use area, or water body where some Forest visitors have a major concern for the scenic qualities as a natural appearing to slightly altered landscape.*

The goal for Forest Plan Management Area A9, Special Interest Area is: *to manage, preserve, and interpret areas of significant cultural, historical, geological, botanical, or other special characteristics for educational, scientific, and public enjoyment purposes.*

Alternative A - No Action

There would be no changes to visual quality.

Effects Common to All Action Alternatives

Direct and Indirect Effects

There are 324 acres of A4 along FR 6215 forming the northern border of the project planning area and adjacent to the Wenaha Wilderness. No activities are proposed in this area. All project activities are distant from this area; the closest is a mile away and not visible from FR 6215. There will be no impacts to visual quality with any alternative.

The Special Interest Area in the Lower Sheep Planning Area is the Lookout Mountain viewpoint overlooking Alder Creek and Bear Creek drainages of the Grande Ronde River. It is located in the northeast corner of the project planning area. There are no planned activities near the viewpoint, the closest being thinning units approximately 1.5 miles away. Harvest units 46, 47, and 45 may be visible along with some of the hand fuel treatments in Fuels Reduction Area 1. The harvest units are prescribed for treatments that leave fully stocked stands: most of the treatments are commercial thinning. The resulting forest texture change would be unnoticeable in the middle-ground (one and a half miles). The hand fuel treatments are three-quarter miles away and would be undetectable through the unaltered canopy. The proposed landscape prescribed fire in the Grande Ronde canyon would not impact visual quality because there is no view of the slopes proposed for burning.

Cumulative Effects

Past logging activities are visible but distant from the viewer at the Lookout Mountain viewpoint. Past logging includes clearcuts over 20 years old that have become plantations and are visually subordinate on the landscape. All harvest activities, including the proposed harvest, occurs in the middle-ground. Past harvest visual effects would continue to moderate towards a near-natural appearance over time and the proposed harvest units would not impact this process.

Range

The Forest Plan states the following Goal: *To manage the forage resources for an upward vegetation trend in areas in "less than fair" condition and an upward or stable trend for areas in "fair" or better condition, while providing for forage productivity and making suitable range available for livestock grazing. Increase the level of forage production where cost efficient and consistent with resource goals.*

This analysis does not propose any changes to the existing grazing allotments. The affects analysis will be confined to impacts to grazing and the use of the area when any of the proposed actions occur. Where grazing causes a cumulative effect with the proposed action, it will be discussed under the resource issue.

A summary of findings:

- Actions are within the North End Sheep & Goat Allotment and the Brock Cattle & Horse Allotment
- The Jarboe grazing unit of the North End Allotment and the Transitory and Pearson grazing units of the Brock Allotment fall within the planning area. The Jarboe grazing unit is used by sheep four out of every 5 years from June 1st through October 9th. The Transitory grazing unit is used by cattle annually from June 10th through August 15th and the Pearson grazing unit is used by cattle annually from August 16th through October 15th.
- The North End Sheep and Goat Allotment has been in non-use since 2001.

Alternative A - No Action

Direct, Indirect, and Cumulative Effects

Grazing trends would continue unchanged. Monitoring indicates that overgrazing is not occurring in natural meadows, riparian areas, and transitory range provides adequate forage. Over the next 5 to 10 years, plantations making up transitory range would no longer provide forage, livestock may compete for grasses produced in natural meadows with big game. Currently, there are 6,000 acres of plantations less than 25 years old that provide transitory range. Approximately 16 percent of the transitory range would be lost in 10 years and 62 percent would be lost in 15 years.

Effects Common to All Action Alternatives

Direct and Indirect Effects

Historically, logging operations have not been a problem for livestock. Logging and slash treatments would be coordinated with routing schedules so the operations would not interfere with the timing of grazing (see Chapter 2). The contractors are required to protect improvements such as fence lines, cattle guards, and watering developments. Neither of the allotments utilizes the vegetation in the Grande Ronde Canyon. The proposed prescribed fire should not impact the timing and use of the grazing units. The boundary of North End Sheep Allotment was originally a mile from the canyon but it was modified to move it further from the Grande Ronde Canyon to assure avoidance with big horn sheep.

The use of prescribed fire in the harvest units would rejuvenate grasses and provide grazing opportunity as transitory range. The thinning of overstory crowns would let more sunlight to the forest floor increasing herbaceous and brush species. There would be lower opportunity for grazing under stands using mastication for slash treatments because less ground would be exposed for regenerating herbaceous species and the quick flush of vegetation growth stimulated by burn released nutrients would be replaced by the slower release from decomposition.

Cumulative Effects

Monitoring plots in natural meadows do not show over-grazing where livestock compete with big game. Years of monitoring show a stable trend. Utilization has remained the same. Management actions in the frequent and mixed fire regimes would increase transitory range and available forage. Improvement harvest and thinning would reduce stand densities to recommended stocking levels creating open stand conditions favorable to the production of forage.

Table 4-29. Treatment Acres to Create Open Forest Conditions and Available for Grazing in Ten Years

Alternative	Acres of Improvement harvest	Acres treated by Shelterwood and Seed Tree	Total Acres Available for Grazing
B	1535	59	1594
C	951	39	990
D	964	59	1023
E	962	57	1019

Pest Management

The Forest Plan states the following goal**:** *Protect forest and range resources from unacceptable losses due to destructive forest pests (insects, diseases, and noxious weeds).*

Insects and Diseases

Forest stands in the planning area are highly susceptible to defoliators, bark beetles, root rots, and dwarf mistletoe because of the high number of stands that are overstocked, are dominated by susceptible species, and have more canopy layers than historically. Fir engraver bark beetle is currently the most active agent of mortality in stands with large numbers of grand fir.

Alternative A - No Action

Stands would continue to experience mortality and reduced growth through insects and diseases as they become more overstocked with late seral species in multiple layers. During epidemics of defoliator insects, stands could suffer such high levels of mortality that they would lose most of their cover value and would have large amounts of dead fuel.

Effects Common to All Action Alternatives

The following table shows the number of acres in each alternative where the risk of defoliation would be reduced through reduction of susceptible species and multiple layers.

Table 4-30. Acres of Harvest by Defoliator Risk Rating, by Alternative

Defoliator Risk Rating	Acres Alt B	Acres Alt C	Acres Alt D	Acres Alt E
High	1,542	997	906	910
Medium	255	201	174	188
Low	15	10	10	10
Total	1,812	1,208	1,090	1,108

The following table shows the number of acres in each alternative where the risk of fir engraver attack would be reduced through reduction of susceptible species and reduction of competition stress which predisposes trees to attack.

Table 4-31. Acres of Harvest by Fir Engraver Risk Rating, by Alternative

Fir Engraver Risk Rating	Acres Alt B	Acres Alt C	Acres Alt D	Acres Alt E
High	1,205	660	582	585
Medium	511	457	418	432
Low	96	91	90	91
Total	1,812	1,208	1,090	1,108

The spread of infection by dwarf mistletoe would be reduced in all harvest units, as mistletoe infected trees would be high priority for removal. In Alternative C, there would be less reduction of infected trees because all trees greater than or equal to 21" DBH would be left.

Noxious Weeds

Natural conditions that prevent the spread of noxious weeds include: herbaceous cover, duff and forest floor litter, and canopy closure.

Within the 26,343-acre Lower Sheep planning area, noxious weeds occupy approximately 21 net acres spread over 966 acres. The sites are located along or close to the road system. Diffuse and spotted knapweed are the most prevalent species although a total of 14 weed species have been found in the area. Two of the highest priority species (tansy ragwort and yellow star-thistle) have apparently been eradicated from the planning area.

Alternative A - No Action

Treatment of noxious would continue under the Forest Noxious Weed EA. The District has an agreement with Union County that allows them to treat weeds along open forest roads. Spread of weeds would be controlled and the sites revegetated naturally to prevent the continued occurrence of the weeds. Natural mechanisms such as wind, water, and wildlife, and human activities along existing roads, would spread weeds to disturbed sites. Cumulatively, grazing and public vehicle access, including ATVs, would continue to be vectors for the spread of noxious weeds. The access and travel management plan allows vehicle use within 300 feet of open roads. There would be risk of spreading noxious weeds through recreational use when ground disturbance occurs, particularly on the dry grassland sites.

Effects Common to All Action Alternatives

In addition to the noxious weed spreading mechanisms identified under the No Action Alternative, noxious weeds could be spread by logging machinery and other vehicles associated with harvest operations along roadways or into the edges of stands where soil is disturbed. The Noxious Weed Management Plan found in Chapter II includes prevention measures for the control of noxious weeds. The road system and rock sources would be surveyed for noxious weed sites. Treatments are confined to the haul and access roads. The low levels of exposure of soil decrease the risk of spreading noxious weeds into the forest. There would be no loss to forest productivity by controlling the spread of noxious weeds. The spread of weeds into the harvest units is not likely because ground cover and tree canopy would reduce success. Past monitoring of harvest units on the district indicates that noxious of weeds of high concern have not become established in units. Noxious weed spread is confined to the road system. Windblown seeds, like thistle, get established after burning exposes soil but it is shaded out when the forest canopy closes.

Table 4-32. Acres of Noxious weed sites along or close to roads and are next to or within proposed harvest units

Alternative	Gross acres	Infested acres
Alt. B	36.9	1.5
Alt. C	29.8	1.3
Alt. D	30.4	1.2
Alt. E	31.5	1.2

There are 45 noxious weed sites along haul routes. The majority of these sites are knapweeds, and there are two sulphur cinquefoil sites. These have been and would continue to be treated with either chemicals or by hand-pulling. There are 21.7 gross acres, 0.2 infested acres, of noxious weeds in proposed fire areas. There are several sites of leafy spurge along the Grande Ronde River, and one site of reed canary grass. The boundary of the prescribed burn would not reach the areas where these species grow. The other sites within proposed fire areas are knapweeds sites that are along roads and have been treated.

There are knapweed sites in or near three of the rock source sites. These have been treated. The areas would be monitored before material is moved from the site. Expansion of noxious weeds is not expected because the proposed prevention measures and stand conditions would be effective to control potential spread.

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 (Cultural Resources)

A review of the Umatilla National Forest heritage files indicates that the entire Lower Sheep analysis has been surveyed. As a result of the above inventory projects approximately 48 heritage properties were located within the Lower Sheep analysis area. Twenty-one of these properties are isolated artifacts and are not considered eligible for inclusion in the National Register of Historic Places (NRHP). The remaining 27 properties consist of 17 Euro-American sites and 10 Native American sites and are potentially eligible for listing in the NRHP.

There are two historic sites located within or immediately adjacent to, proposed activity areas.

Avoidance measures would be implemented where necessary, per Stip.III.B.2(a-d) of the Programmatic Agreement between the Advisory Council on Historic Preservation (ACHP), the Oregon State Historic Preservation Officer (SHPO), and the United States Forest Service (USFS) Region 6, signed March 1997. Because heritage resources would not be affected by proposed project activities under any of the proposed alternatives, there would be *no effect* to any cultural property listed in, or eligible to the NRHP. Documentation to this affect will be forwarded to the Oregon SHPO, in compliance with the National Preservation Act of 1966 (as amended), 36 CFR 800.4 and the Programmatic Agreement.

Disclosure Statement for Compliance with the Migratory Bird Treaty Act and Executive Order 13186

Activities under all the action alternatives could result in an unintentional take of individual neotropical migratory birds. However, these alternatives would comply with the Fish and Wildlife Service Directors order #131 related to applicability of the Migratory Bird Treaty Act to federal agencies and requirements for permits for "take". In addition, these alternatives are compliant with Executive Order 13186 because the analysis meets our obligation as defined under the January 16, 2001 Memorandum Of Understanding

between the USDA Forest Service and USDI Fish and Wildlife Service designed to complement Executive Order 13186. The purpose of this Memorandum Of Understanding is to strengthen migratory bird conservation through enhanced collaboration between the Forest Service and the Fish and Wildlife Service, and with state, tribal, and local governments. As required, these alternatives 1) identify management practices that could affect high priority species as defined in the Memorandum Of Understanding and Partners in Flight, and 2) develop conservation measures to avoid or minimize impact to migratory birds.

Threatened, Endangered, and Sensitive Aquatic, Terrestrial, and Plant Species

Biological evaluations for aquatic, terrestrial, and botanic species have been prepared to evaluate impacts from each alternative to federally listed species. Federally listed species includes those identified as Endangered, Threatened, Proposed or Candidate species by the U.S. Fish and Wildlife Service and National Marine Fisheries Service. Sensitive species are those identified on the R6 Regional Forester Sensitive Species Lists that meets National Forest Management Act obligations and requirements (dated November, 2000 for fish and wildlife and dated July 2004 for plants). Sensitive species addressed on the Umatilla National Forest include those that have been documented or suspected to occur within or adjacent to the Forest boundary. Species likely to inhabit the Planning Area are described in Chapter 3. None of the proposed projects would adversely affect, contribute to a trend toward Federal listing, nor cause a loss of viability to listed Sensitive plant and animal populations or species.

With regards to threatened and endangered species, a determination has been made that the proposed actions will not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent conservation alternatives. Consultation with the regulatory agencies will be completed prior to signing a decision implementing any action.

A summary of the determinations is presented here.

Determinations for Terrestrial Species

Preliminary determination has been made that the proposed projects may affect, but will not likely adversely affect Canada lynx. Consultation for gray wolf and bald eagle is not necessary since a determination has been made that the proposed activities will have no effect to those species.

Table 4-33. Conclusion of Effects for Terrestrial Wildlife Threatened, Endangered, and Sensitive Species

Species	Status	Determinations by Alternative				
		A	B	C	D	E
Gray wolf Canis lupus	Threatened	No Effect	No Effect	No Effect	No Effect	No Effect
Canada lynx Lynx canadensis	Threatened	No Effect	NLAA	NLAA	No Effect	NLAA
Bald eagle Haliaeetus leucocephalus	Threatened	No Effect	No Effect	No Effect	No Effect	No Effect
Peregrine falcon Falco peregrinus	Sensitive	No Impact	No Impact	No Impact	No Impact	No Impact
California Wolverine Gulo gulo	Sensitive	No Impact	No Impact	No Impact	No Impact	No Impact

Species	Status	Determinations by Alternative				
		A	B	C	D	E
Rocky Mountain bighorn sheep Ovis canadensis	Sensitive	No Impact	No Impact	No Impact	No Impact	No Impact
Columbia spotted frog Rana luteiventris	Sensitive	No Impact	No Impact	No Impact	No Impact	No Impact

NE No effect on a proposed or listed species or critical habitat
NLAA May affect, but not likely to adversely affect a listed species or critical habitat
NI No Impact to R6 sensitive species individuals, populations, or their habitat

Plant Species

The planning area was surveyed as part of the following six plant surveys: Timothy P.A., 1991; Fry, 1993; Jarboe-Brock, 1994; 49er, 1995; Lower Little Lookingglass, 1996; Upper Jarboe, 2000. Areas not covered by these surveys were surveyed in 2004.

Botrychium lanceolatum, Botrychium minganense, and Botrychium pinnatum; listed on the Regional Forester's sensitive list; were found within several harvest units of the original Proposed Action. These harvest units were not included in the Modified Proposed Action or any of the analyzed alternatives. This project will have no impact on these species.

Leptodactylon pungens ssp. hazeline (prickly phlox) is a dry site species ranked most rare in Oregon and is a Federal Species of Concern. One population is located in Fuel Reduction Area 8 in a rocky cliff. There is little fuel to carry a fire. Prescribed fire would not have an impact on the phlox. This project will have no impact on this currently listed Region 6 species.

Carex backii (back's sedge) occurs on a small tributary just above the confluence with the Grande Ronde within Fuel Reduction Area 8. It is likely adapted to late season ground fires, although a hot fire could kill them. A low intensity fall burn would not contribute towards a federal listing or cause loss of viability to the species. Fall burning is recommended. Proposed Activities may temporarily impact potential habitat (2 to 5 years) by reducing shade from shrub species, and might impact individual plants, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the species.

Silene spaldingii is Federally Listed as Threatened. It is known to occur on the Umatilla and Wallowa-Whitman National Forests. It occurs in open grasslands with deep Palousian soils. No suitable habitat was identified during the course of sensitive plant surveys. This project complies with present Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

Non-vascular species. Pre-field assessments, combined with field observations during vascular plant surveys, indicate that no potential habitat exists for rare non-vascular plant species. This project will have no impact on this currently listed Region 6 species.

Aquatic Species

It has been determined for any alternative:

For ESA Threatened bull trout, Snake River steelhead, Snake River spring/summer Chinook salmon or Snake River fall Chinook salmon - may affect but not likely to be adversely affect these species.

For R6 Sensitive redband trout - may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

For Regional Forester Sensitive Columbia duskysnail (*Lyogyrus sp*.) - no impact.

Magnuson-Stevens Fishery Conservation and Management Act, Essential fish habitat.

Essential fish habitat applies only to habitat for commercially important fish species. For the Umatilla National Forest these are Chinook and coho salmon. Under authority of the Magnuson-Stevens Fishery Conservation and Management Act and Public Law 104-297, the Sustainable Fisheries Act of 1996, the Pacific Fishery Management Council has identified both the upper and lower Grande Ronde Hydrologic Units (HUC's 17060104 and 17060106) as Essential Fish Habitat (EFH) for both Chinook and coho salmon. The Pacific Fishery Management Council defines EFH as "all currently viable waters and most of the habitat historically accessible to salmon within the USGS hydrologic units identified…"

For Chinook this would include Mainstem Lookingglass Creek at least as far upstream as the springs above the mouth of Summer Creek, Little Lookingglass Creek, perhaps as far as the confluence with Buzzard Creek, and the Grande Ronde River. The remainder of the project area streams either go dry or flow becomes so low that there is no effective holding water for spring adult Chinook to wait out the summer, and these streams would be inaccessible to fall Chinook. Juvenile Chinook probably use the lower reaches of some of these streams as rearing habitat. The Wenaha River north of the project area would certainly be considered EFH.

Coho, on the other hand are winter spawners (Groot and Margolis, 1991) and many of the smaller streams (Sheep Creek, Meadow Creek, Alder Creek, some tributaries of the Lookingglass system) would have been flowing during their spawning times. So coho could conceivably have used these streams before they were extirpated from the Grande Ronde system.

Most named streams downstream of longstanding natural barriers in the analysis area would be counted as Essential Fish Habitat. The proposed Lower Sheep project May Affect, But Is Not Likely To Adversely Affect Columbia River bull trout, Snake River steelhead, Snake River spring/summer and fall Chinook salmon, or their Designated Critical Habitat, Proposed Critical Habitat, or Magnuson-Stevens Act Essential Fish Habitat.

Wetlands and Floodplains

Executive order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impacts of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. The proposed road maintenance and culvert replacements or additions would reduce the risk of loss to infrastructure and fish habitat and help preserve the values provided by flood plains. The addition of an overflow culvert at Sheep Creek on FR 6231 would provide passage for increased spring flows and the increase in size of cross drain culverts would help to reduce the risk of road failure. Harvest would not occur within 100-year floodplains due to RHCA protection detailed in Chapter 2 and are sufficient to comply with the requirements of this executive order.

Executive Order 11990 requires that government agencies take action to minimize the destruction, loss or degradation of wetlands. Streamside riparian areas, seeps, springs, and other wet habitat exists within the project area. These areas would be avoided according to RHCA boundaries defined in PACFISH and the mitigation measures identified in Chapter 2. These measures are judged to meet the intent of Executive Order 11990.

Clean Water Act Compliance

The Upper Grande Ronde TMDL and Forestry WQMP provide direction for meeting the assigned temperature load on National Forest lands. The policies and design criteria identified in the WQMP would be fully incorporated into the design of the projects proposed in the Lower Sheep analysis area. Currently there are no water impairments listed in the portion of the analysis area that is in the Lower Grande Ronde Subbasin.

The proposed actions would be designed in compliance with the Umatilla Forest Plan as Amended by PACFISH. Other design criteria, Best Management Practices, and mitigations would be prescribed and implementation monitoring would document their use. The projects proposed Lower Sheep Timber Sale and Fire Reintroduction Project would be in compliance with the Clean Water Act and with the State of Oregon Water Quality Standards.

Clean Air Act

All proposed prescribed burning would be conducted in compliance with National Ambient Air Quality Standards and Oregon Department of Environmental Quality (ODEQ) regulations and restrictions contained in the Oregon Smoke Management Plan (ODEQ Directive 1-4-1-601). Fuel treatments can be timed to minimize the impacts of smoke on forest users and local communities. An operator's burn plan is developed prior to ignition. On site weather conditions are monitored before, during, and after an ignition. Ocular smoke observations are made throughout the ignition phase. Residual smoke is monitored for dispersion and direction. No ignitions will occur if the is an air stagnation advisory in place within the northeast Oregon geographic area. No ignitions would occur if existing or forecast conditions would transport measurable smoke into down wind communities. The removal and direct treatment of biomass would reduce emissions should a wildfire occur. The effect of smoke under any action alternative would be short term and restricted to dispersed campgrounds. Particulate matter is not expected to exceed standards in the communities of concern (Asotin, Elgin, Enterprise, and La Grande). See Air Quality analysis and impacts within the Grande Ronde Wild and Scenic River Corridor.

National Forest Management Act Compliance

The proposed harvest and prescribed fire activities will meet direction of CFR 36 219.27. Resource protection measures have been included in the project design (Chapter 2) and effects of implementation disclosed in the analysis (Chapter 4). Soil productivity and water quality are being protected and management requirements and BMPs minimize serious and long lasting hazards. The project has a focus on prevention or reduction of serious, long lasting hazards and damage from pest organisms and wildfire through the use of silvicultural systems that involves harvest and landscape prescribed fire without harvest to maintain stand vigor and seral tree species characteristic of historical fire disturbance processes. The implementation of PACFISH guidelines protects stream, streambank, and wetland habitats providing adequate fish habitat to maintain viable populations of fish. The proposed landscape prescribed fire and hand fuel treatments within the frequent fire regime restore the open stand condition to the landscape, increasing the forest's ability to maintain viable wildlife populations that are dependent on a diverse mix of habitats. The proposed thinning in the mixed fire regime reduces surface and ladder fuels in stands transitioning to complex fuel structure and maintains seral western larch as a dominate tree species.

All proposed harvest units are planned on suitable land. The 59 acres (48 acres with Alternative C) proposed for regeneration harvest will be capable of re-stocking within 5 years of harvest either by natural or artificial means. The action alternatives favor the development of stands dominated by seral tree species. The proposed action and alternatives accomplish multiple-use resource goals providing wood fiber, habitat diversity, fuel reductions for protection of private property and restoration of the frequent fire regime within and adjacent to the Grande Ronde River Canyon, and increase stand vigor and resilience to insects and wildland fire. The Table 4-34 below displays the silvicultural harvest methods prescribed as a percent of proposed harvest treatments.

Table 4-34. Harvest Prescriptions by Alternative in %

Harvest Method	B	C	D	E
Even aged	3%	3%	6%	6%
Intermediate	83%	86%	84%	82%
Uneven aged	14%	11%	10%	12%

Forest Plan Consistency

The analysis performed by the interdisciplinary team found that the action proposed under Alternatives B, C, D and E are consistent with the Forest Plan. The purpose and need is consistent with Forest Plan goals. All alternatives accomplish Forest Plan goals for resources of concern listed in Chapter 1 and analyzed in Chapter 4. Impacts to resources have been evaluated and found to be consistent with Forest Plan Standards and Guidelines as disclosed in Chapter 4. All timber harvest activities are proposed within Forest Plan Management Areas that allow scheduled harvest and are compatible with their goals and objectives as well as being consistent with their standards and guidelines, for example the project is consistent with standards and guidelines for HEI and cover for big game in C4 and E2 (see Table 4-35 below). The proposed prescribed fire in A9 – Scenic and A 7 Wild and Scenic River is a permitted activity and is an expected natural process. Soil productivity is conserved because none of the activity units would exceed the standards for detrimental soil conditions. Design stands conserve management indicator species. The proposed fuel reduction and restoration are consistent with Forest Plan goals; the activities increase resilience to naturally occurring wildfires, fire would be used to shape forest cover, landscape prescribed fire would be used in ponderosa pine, and the diversity of vegetation patterns would be maintained.

Table 4-35. Gross Acres of Harvest in Current Forest Plan Management Areas

Alternative	C4	E2	Total
B	843	969	1812
C	646	562	1208
D	764	326	1090
E	764	344	1108

PACFISH : The project has been designed to conform to Forest Plan Amendment 10 for PACFISH. Management Requirements to protect water quality and fisheries habitat have been identified in Chapter 2 and Appendix E for Best Management Practices. Impacts to water quality and fisheries habitat has been disclosed in relation to meeting PACFISH guidelines.

Eastside Screens: The harvest activities meet the specifications of Forest Plan Amendment 11 (Eastside Screens). An HRV analysis was performed. The wildlife screen for late old structure indicated Moist Forest was within or above HRV and the Dry Forest was below HRV for single structure stands. Large trees (greater than 21 inches) in Dry Forest would not be harvested. Stands to be thinned or proposed for unevenaged management in Late Old Structure (LOS) would not have large trees removed whether the proposed harvest was in Dry Forest or Moist Forest. Alternatives B, D, and E proposes harvest in LOS but the stands would remain LOS. Alternatives B, D, and E would also remove a few diseased large trees in non-LOS in moist forest representing less than 1 percent of the total trees designated for removal. Old Forest stands would retain connectivity. The proposed harvest in Moist Forest meets the criteria for Scenario B of the screens. There would be no fragmentation of old forest stands. Old structure is being retained in the Dry Forest stands and no dry old forest stands would be entered; the criteria for Scenario A would be met. See Appendix G for the HRV analysis.

Snags and Large Wood: After harvest and prescribed fire snag levels would meet Forest Plan standards. The Umatilla Forest Plan (1990) established standards and guidelines for dead standing and down wood for various levels of biological potential in each management area. The plan was amended in 1995 by the Regional Forester as Umatilla Forest Plan Amendment #11, also known as the "Eastside Screens." Based on the amended direction, "new" snag requirements and replacement tree objectives were developed for each of the biophysical types on the Forest and documented in the memo, "*Interim Snag Guidance for Salvage Operation*" (Umatilla National Forest 1993). The 0.14/acre density for snags greater than 20 inches reflects the 100 percent PPL for the Eastside Screen amendment.

Management Indicator Species: The analysis indicates that the proposed activities would meet Forest Plan standards and guidelines for management indicator species. The proposed activities would not cause a loss of viability to the population redband trout and have an indiscernible impact to steelhead trout because waterfalls within a half to one and a half miles from the Grande Ronde River keep the fish from accessing the interior of the planning area. The section of the Grande Ronde River along the boundary of the planning area is too warm for rearing or spawning. Big game HEI and cover standards would be met for Forest Plan management areas C4 and E2. The analysis indicates that habitat quality for the pileated woodpecker and other primary cavity excavators would be maintained.

Prime Farmland, Rangeland, and Forestland

No prime farmland, rangeland, or forestland occurs within the analysis area.

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.

Alternatives B, C, D, and E would have an irreversible commitment of rock used to resurface roads, however, this would not significantly deplete the overall supply of rock suitable for road surfacing. The production of crushed and pit run rock would produce an irreversible change to the natural landscape. Rock would come from two sources. BMPs, sale design, and other mitigation identified in Chapter II would prevent significant loss of soils to erosion.

There would be no construction of permanent system roads. Up to 2.0 miles of temporary road construction is proposed. Temporary road construction would pose an irretrievable loss of productivity. Revegetation and subsoiling would restore productivity for many of the temporary roads and landings, particularly by the reduction of compaction. Since full recontouring would not occur, temporary road construction would result in some irretrievable losses in hydrologic function though roads would be outsloped and subsoiled to reduce impacts and increase the success of regeneration. There would be areas of filtration or catch basins that would trap sediment, keeping it from impacting streams.

The cutting of green trees or snags for safety is an irretrievable loss for future down wood. The proposed harvest has includes measures that retains replacement trees for future snags so the loss is not irreversible. Trees remain throughout the unit that can become future snags. The large overstory trees left in the shelterwood and seedtree units would be dedicated to future snags. The thinning would impact the natural timing that trees would become snags because intertree competition would be reduced and the increased vigor would allow them to resist insects and disease. It is hard to estimate when future management would occur, however there is an opportunity to allow the stands to grow longer, delaying future harvest, to allow intertree competition.

There is an inherent risk of accelerating landslides, erosion, and soil compaction when harvesting timber, performing road obliteration, or using prescribed fire that can lead to a loss in productivity. Road obliteration and subsoiling past harvest units also partially restores irreversible effects of past actions. The soil and water protection measures identified in the Forest Plan and management requirements in Chapter II are designed to avoid or minimize the potential for irreversible losses to soil productivity. Past harvest activity has not indicated a problem with landslides. Protection measures for ash soils would be effective in reducing detrimental soil conditions and protect soil productivity.

There would be irreversible impacts to redband trout habitat by sediment from culvert installation. Shade, sources of large woody debris, pools, and channel stability is protected by restricting vegetation management activities to areas outside of RHCAs. Redband trout were introduced at some time to Sheep Creek and Jarboe Creek but natural fish barriers confine them to the planning area. Steelhead trout, chinook salmon, and bull trout use the Grande Ronde River as a migration route. This section of the river

is too warm for rearing and spawning though the fish may use to lower reaches of Sheep and Meadow Creeks below the falls. Road obliteration, road maintenance, landscape prescribed fire, and timber harvest would contribute to short-term sediment production but would not be measurable. The proposed activities would not impact redband trout and impacts to listed fish would be immeasurable.

Species extinction is irreversible, so it is essential that habitat for sensitive species be maintained or enhanced. The actions would increase habitat diversity by restoring single stratum forests to the landscape. The mosaic of forest structure would be more resilient to wildfires and insect epidemics because of the increase of early seral tree species, the lowering of stocking levels, and lower fire severity. The proposed Forest Plan amendment provides standards and guidelines for the conservation of lynx.

There would be an irretrievable loss of some large trees from the Moist Forest biophysical type being removed because of severe disease. There would be no large trees removed from Old Forest stands and the proposed harvest would retain the old forest character. Since less than 1 percent of the total trees proposed for removal would be large trees, large trees would remain common on the landscape. The proposed thinning would develop large trees quicker than natural processes. The reduced stocking level is important to western larch because they do not take crowding and do not release well after being suppressed. Thinning is very important to the establishment of large larch. The proposed reduction of trees around the large trees would also reduce stress and increase resilience to insects.

American Indian 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 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 lands that may affect tribal rights.

Locally, the planning area lies within the area ceded to the United States government by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) as a result of the Treaty of 1855, and the Nez Perce also by a Treaty of 1855. As a result of the treaty, elements of Indian 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 facilitate the execution of treaty rights and traditional cultural practices of these tribes by working with them on a government to government basis and in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the tribe or the federal government. Because tribal trust activities often occur in common with the public, the Umatilla National Forest strives to manage ceded lands in favor of the concerns of the tribes, as far as practicable, while still providing goods and service to all people.

Specific treaty rights applicable to that land base managed by the Umatilla National Forest are generally articulated in the Treaty and include:

> "The exclusive right of taking fish in all the streams running through or boarding said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Although the 1855 Treaty does 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.

Because the government is bound to perform its trust duties in a manner that will not diminish, abridge, violate or abrogate reserved treaty or executive order rights, the Umatilla National Forest has endeavored

to solicit the comments of the Nez Perce and the Confederated Tribes of the Umatilla Indian Reservation to determine what effects may occur to Tribal welfare and treaty resources as a result of implementing projects included in the planning area. The Confederated Tribes of the Umatilla Indian Reservation provided comments and visited the planning area with the District Ranger, Planning Staff, and Fisheries Biologist. The Planning Area has historically been used as a travelway between the Umatilla and Grande Ronde basins. This section will recap potential impacts to exercising treaty rights. More detail can be found in the analysis for the resource earlier in this chapter.

Impacts to fisheries: Project design protects habitat from detrimental impacts. There are no ESA listed species within the interior of the Planning Area boundaries; however, they do use the Grande Ronde River for migration. Vegetation management projects occur distant to streams and PACFISH guidelines protect habitat from degradation. Potential impacts to fisheries habitat come from instream culvert installation and landscape prescribed fire along the canyon wall. The culvert installation in Sheep Creek is above the water fall that causes a natural stream barrier to passage of steelhead and bull trout. The landscape prescribed fire would not ignite within RHCAs but backing fires would be allowed to enter the RHCA. There would be immeasurable impacts to fisheries habitat.

Viable populations of existing and desired wildlife species: The proposed vegetation management treatment begins restoration of the frequent fire regime to reflect historic character. This increases habitat that is not currently found on the landscape. It supports development of habitat needed to maintain viable populations of species dependent on open forest conditions.

Road and Access: There are no changes to the access and travel management plan for this area so the activities would not impact current access for exercising treaty rights.

Threatened and Endangered species: Detailed discussion about impacts to ESA listed species is found earlier in Chapter 4.

Consumers, Minority Groups, and Women

Alternatives B, C, D and E and improvement projects would be governed by a Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. This contract also contains nondiscrimination requirements. While timber harvest identified here creates jobs and 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.

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 any of these alternatives, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. Smoke management would keep particulate matter within standards. Past burning and wildfires did not show degradation below standards at EPA stations in La Grande, Oregon. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts related to timber harvest or contractors implementing rehabilitation activities. The proposed actions should have a positive affect on mushroom and cultural plants, which often consist of low income or minority groups. Racial and cultural minority groups could be prevalent in the work forces that implement harvest, prescribed fire, tree planting, herbicide application, thinning, or fish habitat improvement projects. Contracts contain clauses, which address worker safety, and additional measures regarding herbicide application have been detailed in mitigation measures from the Forest Noxious Weed EA.

Appendix A – Forest Plan Management Areas

The following is a summary of direction for Forest Plan Management Areas. This is not a complete listing of all Management Areas in the Planning Area; it only includes those management areas that contain a proposed activity.

Management Area: C4 Wildlife Habitat

Goal

"Manage Forest Lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphases on size and distribution of habitat components (forage and cover areas for elk, 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. Management activities including timber harvest, prescribed fire, tree planting, and thinning will be readily apparent. Created openings will range from 1-2 acres up to 40 acres (generally 20 to 30 acres) in size. At least 15 percent of the area will be maintained as satisfactory cover, which will appear as stands of trees larger than 10 acres in size, with crown closures of 70 percent or more. An additional 15 to 25 percent of the area will be maintained as marginal cover with crown closures of 40 to 69 percent, and generally capable of obscuring 90 percent of a standing elk at a distance of 200 feet or less. Stands managed using uneven-aged practices will also be apparent. Through the use of both even-aged and uneven-aged silvicultural treatments, horizontal and vertical diversity of timber stands will be maintained, providing habitat for a wide variety of wildlife species.

A variety of native and seeded grasses, sedges, forbs, and shrubs will be available for big game, other wildlife, and domestic livestock. Range and timber management practices will result in improved range condition and increased amounts of available forage.

Emphasis will be apparent on managing roads, providing security for big game, protecting important calving and fawning areas, and providing for a quality hunting experience. Road closures and other management techniques will result in a noticeable amount of travel restrictions across the area. Dispersed recreation opportunities of all types will be available, but motorized access may be limited. As a result of management, quality big game and other wildlife habitat will assist in meeting state wildlife agency population and productivity goals and Forest recreation objectives."

Management Area Standards and Guidelines for C4

"Wildlife: Elk habitat will be managed to achieve a habitat effectiveness index of no less than 60, including discounts for roads open to motorized vehicular traffic, as described in Wildlife Habitats in Managed Forests (Thomas and others 1979). Marginal cover, satisfactory cover, and forage areas will be managed to meet size and spacing criteria as described in Habitat Effectiveness Index for Elk on Blue Mountain Winter Ranges (Thomas and others 1988). The habitat effectiveness standard will be measured on a subwatershed (allocation zone) basis.

> **Cover**: A minimum of 15 percent of the area will be managed as satisfactory cover (20 percent is desirable). If this is not attainable because of low natural potential, the highest percentage of satisfactory cover potentially attainable will be created or maintained. A minimum of 30 percent of an area will be managed as total cover.

Stands managed for satisfactory cover will meet the following criteria:

- Be at least 40 feet in height, with a canopy closure of at least 70 percent in all forest types;
- should be 1,200 to 1,850 feet in width (larger cover areas are preferable) though exceptions may be made by wildlife biologists on an on-the-ground assessment of the stand(s) value for elk; and
- satisfactory cover should generally appear as a multi-layered timber stand.

Marginal cover will be no less than 10 feet in height with a canopy closure of at least 40 percent, and 600 to 1,200 feet wide. Exceptions may be made by wildlife biologists on an on-the-ground assessment of the stand(s) value for elk.

All cover areas will be managed to provide sufficient vegetation to obscure 90 percent of a standing elk at a distance of 200 feet or less.

Timber will be managed on a scheduled basis. All timber management practices and intensities consistent with achieving the primary wildlife habitat management goals will be permitted. The selected silvicultural systems applied to timber stands within suitable forest lands will be based on a site-specific examination and analysis, and will be designed to achieve management goals.

Harvest practices may include clearcutting, shelterwood, salvage, removal, and commercial thinnings, as well as group or individual tree selection. Other cultural practices may be used including natural and artificial regeneration, planting genetic stock when available, release, precommercial thinning, and insect, disease, and animal damage protection. Logging and road building should be done with conventional practices, including helicopter.

Fuelwood cutting is permitted consistent with established goals to enhance big game habitat and to maintain or manage dead and down tree habitat at 80 percent of the potential population level…….

Transportation: Road construction, reconstruction, and maintenance are permitted, consistent with the primary overall objective of wildlife habitat management.

Roads will be limited to minimum standards necessary for timber harvesting.

Roads will be closed to meet big game habitat and/or recreation objectives. Roads will be closed upon completion of harvest activities or when open timber sales are inactive. Exceptions may be made by the District Ranger based on a documented analysis and supporting rationale of the need to keep individual roads open.

Fire: For all wildfires in the management area, all suppression strategies (appropriate responses) may be used. Suppression practices will be designed to protect investments in managed forests and to prevent large acreage losses to wildfire.

Wildfire prevention activities should be emphasized.

Fuels should not exceed an average of 12 tons per acre in the 0 to 3-inch size class and an average residue depth of 6 inches, as depicted in the Photo Series for Quantifying Forest Residues (Technical Report PNW 52) (USDA Forest Service 1976b): ….

All types of prescribed fire may be used to accomplish management objectives.

Pests: Use integrated pest management (IPM) principles and strategies in managing insects and disease to meet management objectives. …….

Within the wildlife habitat objectives, protect forest stands (habitats) by practicing prevention activities. Emphasis will be on the prevention of stand and fuels conditions that favor pests increases above epidemic levels. Aggressively suppress insects and disease using cost efficient strategies when outbreaks threaten resource objectives."

Management Area: E2 Timber and Big Game

Goal

"Manage Forest Lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat."

Desired Future Condition

Management of forests for timber production, domestic livestock, big game, and other wildlife habitat will be apparent. Forests will contain a mosaic of even-aged and uneven-aged stands dispersed in a manner creating patterns of tree cover for big game and openings providing forage. Created openings will range from 1-3 acres up to 40 acres, but will often be 20-30 acres in size. Horizontal and vertical diversity will be apparent; tree species will be diverse, but seral, more pest-free species such as ponderosa pine, western larch, and lodgepole pine will predominate. Accumulated fuels will be generally light, and large destructive fires will seldom occur. Prescribe fire will continue to be an important management tool.

A variety of native and seeded grasses, sedges, forbs, and shrubs will be available for big game, other wildlife, and domestic livestock. Range and timber management practices will result in improved range condition and increased amounts of available forage for both big game and domestic livestock. Dispersed recreation opportunities of all types will be available for a variety of users. However, management of roads will result in a noticeable amount of travel restrictions in some areas.

Management Area Standards and Guidelines for E2

Wildlife: Elk habitat will be managed to achieve a habitat effectiveness index of no less than 45, including discounts for roads open to motorized vehicular traffic, as described in *Wildlife Habitats in Managed Forests* (Thomas and others 1979). Marginal and satisfactory cover and forage areas will be managed to meet or exceed the habitat effectiveness standard, using processes described in *Habitat Effectiveness lndex for Elk on Blue Mountain Winter Ranges* (Thomas and others 1988). The habitat effectiveness standard will be measured on a subwatershed (allocation zone) basis.

A minimum of 10 percent of the area will be managed as satisfactory cover (15 to 20 percent is desired). If this is not attainable because of low natural potential, the highest percentage of satisfactory cover potentially attainable will be created or maintained. A minimum of 30 percent of an area will be managed as total cover.

Stands managed for satisfactory cover will meet the following criteria:

- Be at least 40 feet in height, with a canopy closure of at least 70 percent in mixed conifer/lodgepole pine types, and no less than 50 percent in the ponderosa pine type;
- should be 1,200 to 1,850 feet in width (larger cover areas are preferable) though exceptions may be made by wildlife biologists based on an on-the-ground assessment of the stand(s) value for elk: and
- should generally appear as a multi-layered timber stand. ….

Dead and down tree habitat will be managed to provide or maintain 60 percent of the potential population level for all primary cavity excavators, and maintained for other cavity users.

Structural and nonstructural improvement, development, and maintenance for wildlife are permitted.

Management activities will not create barriers to impede movement of big game animals.

An average of one unburned slash pile for every 2 acres should be retained for wildlife cover on even-aged regeneration harvest units. …

Range: Seeding of forage species is permitted where tree establishment and growth are not restricted. Prescribed burning may be practiced to improve range forage conditions and trend.

Timber: Timber will be managed on a scheduled basis. All timber management practices and intensities will be permitted. Even-aged silviculture will be the most commonly used silvicultural system in the mixed conifer, associated species, and lodgepole pine plant communities. Uneven-aged management would be the preferred silvicultural system in ponderosa pine and mixed pine-Douglas-fir plant communities. Uneven-aged management may also be used where necessary to meet management goals.

The following practices may be employed:

- Site preparation - by chemical, mechanical, biological, or manual means, or prescribed fire;
- Tree improvement - improved growing stock, genetic evaluation plantations, and seed production and seed orchard sites;
- Reforestation - natural or artificial;
- Protection of growing stock from animals, insects, and disease;
- Release and weeding;
- Precommercial thinning;
- Fertilization/pruning - may be permitted on a case-by-case basis;
- Commercial thinning;
- Salvage of mortality as needed and
- Final harvest - including even-aged management practices of shelterwood, seed trees, and clearcut, or uneven-aged management practices of individual tree and group selection.

All types of logging systems are permitted in order to meet resource objectives.

Maintain a blend of tree species with a preference for ponderosa pine, western larch, Douglas-fir and lodgepole pine across the Forest. Shade tolerant species such as grand/white fir, Engelmann spruce, and sub-alpine fir should be maintained as a minor stand component. Vegetative diversity should be enhanced or maintained.

Fuelwood and other miscellaneous forest products should be available for public use. ….

Transportation: … Roads may be closed to motorized use in order to meet big game habitat objectives, meet recreation and other resource objectives, and/or reduce maintenance costs.

Fire: For all wildfires in the management area, all suppression strategies (appropriate responses) may be used. Suppression practices will be designed to protect investments in managed tree stands and prevent losses of large acreages to wildfire.

Wildfire prevention activities should be emphasized.

Fuels should not exceed an average of 9 tons per acre in the 0 to 3-inch size class and an average residue depth of 6 inches.

Desired fuel loadings are depicted by the following (Technical Reports PNW 51, 52):…..

All methods of fuel treatment are appropriate. Utilization of wood residues should be encouraged in order to reduce fuel loadings. When treatment is needed to meet resource objectives, prescribed fire is preferred in fire-dependent ecosystems. In ecosystems where fire is not a useful tool, direct fuel treatments methods should be used in reducing fuel accumulations to meet resource management objectives.

Prescribed fire may be used to accomplish a variety of timber and forage production objectives. Care will be used when using prescribed fire due to high resource values and risk of escape fire.

Pests: Use integrated pest management (IPM) principles and strategies in managing insects and diseases to meet management objectives. Monitoring and detection of pest conditions and populations will be done so that corrective treatments consistent with resource objectives can be prescribed at the earliest opportunity. Protect growing stock consistent with the level of investment by practicing high intensity prevention activities.

Emphasis will be on the prevention of stand and fuels conditions that favor pest increases above epidemic levels. Aggressively suppress insects and diseases using the most cost-effective suppression strategies when outbreaks threaten resource management objectives. Use a variety of methods in meeting protection and suppression requirements.

Management Area: A7 Wild and Scenic Rivers (Now Amendment #7)

Goal

Manage classified Wild and Scenic River Segments to appropriate standards as Wild, Scenic, or Recreational River areas, as defined by the Wild and Scenic Rivers Act, Public Law 90-542, October 2, 1968 (U.S. Laws, Statues, etc. 1968), and expanded by the Omnibus Oregon Wild and Scenic Rivers Act of 1988 (Public Laws 100-557).

Desired Future Condition

Each component of the Wild and Scenic River System will be administered to protect and enhance the values for which the rivers were classified and to provide public use and enjoyment of those values. Emphasis will be given to protecting the outstandingly remarkable values for which the river was designated. Anadromous fisheries, wildlife, aesthetic, scenic, historic, archeologic, scientific and other features will be protected. Approved management plans will establish detailed corridor boundary and specify management activities, land acquisition, easements, and other information necessary to protect each segment of the rivers.

Wild Rivers: Wild rivers or sections of rivers will be free of impoundments and continue to be accessible by trail and/or water, and inaccessible by road. The viewing area and shorelines will be essentially natural appearing. Signs of human activity, including structure or evidence of resource use, will be kept to a minimum or will be inconspicuous. … The opportunity to interact with a natural environment, with challenges and minimal sights and sounds of other people will be available. There will generally be no use of motorized vehicles. Where a need to regulate use exists, indirect methods will predominate. Outfitters will provide services to people to help them enjoy and interpret the environment.

Management Areas Standards and Guidelines

Recreation: River-oriented recreation opportunities may be provided, consistent with maintaining and protecting Wild and Scenic River values.

River area recreation will be managed according to the following interim standards:

Wild Classification:

- Manage areas for Primitive, Semi-primitive Non-motorized (SPNM).
- Access will be mostly for floating, walk-in, or horseback opportunities along wild segments.
- No motorized use is permitted in the Grande Ronde, Wenaha, or the wild segment of the North Fork John Day rivers. Motorized watercraft will not be allowed on wild sections of the rivers.

- Only rustic recreation facilities and settings may be permitted. …

Visual: Manage visual resources to meet standards for each classification as follows:

River Classification	Visual Quality Objective
Wild	Preservation is the normal Retention may be used for some limited recreation facilities

Activities within corridors may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes should be of such size, amount, intensity, direction, and pattern that they are not visually evident in the foreground distance zone and are visually subordinate to the characteristic landscape in the middleground distance zone.

Principles of visual management will be applied so that positive attributes of a managed forest can be enjoyed while negative visual aspects of activities will be minimized.

Landscapes containing negative visual elements will be rehabilitated. Landscapes may be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest.

Wildlife and Fish habitat improvement, development, and maintenance projects are permitted, provided Wild and Scenic Rivers objectives are met.

Dead and down tree habitat will be managed to provide or maintain 80 percent of the potential population level for all primary cavity excavators.

Timber: In the Wild sections, timber will be managed on a nonscheduled basis to meet Wild and Scenic River goals. Cutting of trees is only permitted where needed to meet primitive recreation, environmental or other Wild and Scenic River objectives.

Fire: For moderate to high intensity wildfires, the appropriate suppression response will emphasize a control strategy. Emphasis should be on protecting life and facilities.

Wildfire suppression efforts should utilize low impact methods, as use of heavy equipment may require restoration efforts to mitigate visual impacts.

Fuels: Prescribed burning is permitted. Low intensity prescribed fires, producing minimal scorch and rapid recovery, are the most desirable.

Pests: Use integrated pest management (IPM) principles and methods. Prescribed fire may be used to help reduce stocking and conditions favorable for bark beetle and other insects and diseases.

Suppress pests when outbreaks threaten users and/or managed resources. Use suppression methods that minimize site disturbance.

Management Area: A8 Scenic Area

Goal

Protect or enhance the unique natural characteristics of landscapes noted for their scenic beauty.

Description: Scenic areas are areas of natural variety where unique physical characteristics give viewing pleasure and dispersed recreation opportunities to the forest user.

Desired Future Condition

Areas of unique natural beauty and high scenic quality will remain mostly unmodified. Opportunities to experience the scenic values, feelings of vastness and isolation from sights and sounds of human activity,

sense of independence, closeness to nature, and self-reliance shall be maintained and enhanced. Around the edges or through parts of the area, existing roads are to be retained so that motorized users will have an opportunity to experience the unique beauty and sense of vastness. Trail systems featuring non-motorized recreation will be fully developed to encourage and disperse use. In a few cases, vegetative manipulation shall be used to enhance the scenic and other resources in the area.

Management Areas Standards and Guidelines

Recreation: Semi-primitive Non-motorized settings will be provided within the area, … Areas will be managed to maintain opportunities for visitors to get away and achieve a feeling of remoteness from sights and sounds of others. …

Non-motorized use will be favored. Access will be mostly for remote walk-in or horseback activities in an area generally absent of roads; …

Visual: Retention is the visual quality objective for the area … The short-term goal of rehabilitation is used to upgrade landscapes as necessary.

Landscapes may be enhanced by opening views to distant scenery, unique landforms, unusual vegetation, or other features of interest.

Wildlife and Fish: Dead and down tree habitat will be managed to provide or maintain 80 percent of the potential population level for all primary cavity excavators.

Identified old growth units within the management area will be retained as part of the dedicated old growth system.

Transportation: …New roads will not be constructed or roads reconstructed.

Fire: The appropriate wildfire suppression response will emphasize a control strategy for moderate to high intensity fires. Under appropriate fire prediction conditions, low intensity wildfires (0-2 foot flame length) may be permitted to play a natural role within the setting when resulting in a 1 to 2-year vegetative recovery.

Low impact wildfire suppression methods should be used; rehabilitation may be used to mitigate wildfire impacts in conflict with visual quality objectives.

Fuels: Prescribed fire may be used as a tool to manage ecosystems that are dependent on fire as part of their natural succession, or to enhance thrift and vigor of native vegetation.

Prescribed low intensity fire with a 1 to 2-year recovery period is acceptable. A less than 1 year recovery is most desirable if conditions are suitable.

Pests: Use integrated pest management (IPM) principles to manage insects and diseases in meeting scenic area objectives. Suppress pests when outbreaks threaten scenic area objectives or resources in adjacent areas. Favor biological methods when available. Control of defoliators may be accomplished by spraying following approval of an environmental analysis. Use of salvage harvest is limited to catastrophic events.

Appendix B - Response to Public Comments Received During Scoping

The following public comments, questions and concerns about the project did not generate key issues. Many of them will be discussed in more detail as part of the effects analysis disclosed in Chapter IV.

1. There was concern about cumulative effects of past and future activities on the watershed and cover.

   Response: Each resource will consider past, present, and reasonable foreseeable future projects when determining Cumulative effects. Chapter 3 lists projects that can potentially have cumulative effects. In most cases the description of the current condition includes past actions and maybe even current actions. The historic range of variability for the vegetation analysis, HEI for big game, and ETA for hydrologic condition are examples that include past and present actions as part of the current condition. Past actions that impact fisheries habitat have also been identified and corrective measures are proposed with this project as with the replacement of culverts that are barriers to fish. Residual impacts from the past and present activities are combined with those disclosed for the alternative along with potential impacts from future projects to disclose cumulative impacts.

2. There was concern that timber harvest is not an effective way to reduce fire risk. It was felt that opening the canopy in frequent fire regimes could make the stand more fire prone and that large tree removal is not an effective fuel treatment. See the fuels effects discussion in Chapter 4.

   Response – The vegetation management actions proposed in the Planning Area accomplishes multiple objectives that includes stocking level control to maintain health and vigor, maintaining fuel and stand conditions to control wildfire severity, and fuel reductions in dry forest types to maintain stand and vegetation character. There are five Harvest Units totaling 68 acres in dry forest (Table B-1) and another 2,800 acres of dry forest and grasslands treated by prescribed fire. Timber harvest makes up a small portion of the proposed treatments and is needed to reduce ladder fuels and trees less likely to survive a fire.

Table B-1: Harvest Units in the Dry Forest

Unit	*Acres*	*Silviculture Rx*
3	*25*	*Commercial Thinning*
72	*3*	*Commercial Thinning/ Improvement Cut*
73	*11*	*Commercial Thinning/ Improvement Cut*
75a	*19*	*Individual Tree*
78	*10*	*Commercial Thinning*

   Timber harvest reduces stocking levels to maintain growth and vigor, reduce ladder fuels, and includes surface fuel reduction as post harvest treatments to reduce fire intensity and severity. Thinning favors species that are fire resistant. Wildfire response to fuel treatments varies by site depending on the degree of tree removal and amount of untreated fuels, particularly fine fuels, left on site. Wind speed in thinned stands may be higher than non-thinned stands resulting in longer flame lengths; however, research supports the effectiveness of commercial thinning and improvement cutting in reducing fire severity in frequent fire regimes. Below is an excerpt from Chapter 4 of the EA. Note that it points out "the importance of treating fuel profiles in their entirety". All units proposed for harvest would have slash treated after harvest.

"Recent research indicates that stands treated to reduce fuels experience lower fire severity than untreated stands that burn under similar weather and topographic conditions. The Final Report of the *Effects of Fuels Treatment on Wildfire Severity* by Omi et al from the Western Forest Fire Research Center at Colorado University, March 25, 2002 supports the observations and anecdotal information about wildfires burning into treated areas. They compared four wildfires in frequent, low severity fire regimes that burned into treated areas that included repeated prescribed fires, single prescribed fires, debris removal, and mechanical thinning both with and without slash removal. They found a good correlation between fire severity indicators and measures of crown fire hazard to fire resistance *that illustrated the importance of treating fuel profiles in their entirety* (Italics editors). Height to live crown ratio had the strongest correlation to fire severity along with stand density and basal area. Crucial variables that determine a tree's resistance to fire damage were height and diameter; thinning from above, with a primary focus on removing the largest trees, would be ineffective within the context of wildfire management. There was good correlation for reducing surface fuels as well as the importance of thinning the stand for wind driven wildfires. *Even with untreated slash, a thinned stand sustained less damage than untreated stands when the wildfire was driven by winds.*"

3. Are National Fire Plan (NFP) monies being spent on this project, how much and which part of the Fire Plan funding is being used? Is this a high priority for "treatment"? How many private structures/owners are at risk in the project area, have they been contacted and offered assistance to fire-safe their buildings?

   Response: NFP monies fund part of the analysis and would fund the proposed landscape fuels treatment. Monies collected from the timber sale would fund the activity fuels treatment. There are only a few private structures in the planning area, but 2,443 acres of interior private land within the project boundary would receive a degree of protection by reducing surface and ladder fuels on National Forest System lands surrounding the private parcels. The private land owner along the southwest boundary of the Planning Area has begun thinning treatments on their lands. The land owners in Swikert Meadow have also managed their timber and have structures. This project is not a pure fuel reduction project many of the stands are proposed for thinning to maintain growth and vigor of existing early seral tree species. Alternative E was developed to display the effects of an alternative that focuses on reducing the severity of wild land fire at private property boundaries.

4. Concern that the proposed action would not maintain enough large trees to meet future & present wildlife needs.

   Response: This is discussed as part of key issue #2.

5. Concern Road Building, including temporary roads, will affect biological diversity by habitat destruction and fragmentation, increasing edge effects, causing exotic species invasions, increasing vehicle related pollution, and over hunting. Concern that a "Roads EA" should be prepared to document need for roads and prioritize decommissioning.

   Response: The impacts of new road construction, including temporary roads, have been disclosed in the effects analysis for various resources; see fisheries, hydrology, wildlife, and access and travel management in Chapter 4. Below, Table B-2 compares proposed road construction and maintenance for each alternative. There is .1 mi. of proposed new construction that crosses a riparian area south of unit #110.

Table B-2: Comparison of proposed road construction and maintenance for each alternative.

	Alt A	Alt. B	Alt. C	Alt. D	Alt. E
Miles of new road construction	0	0	0	0	0
Miles of temporary road construction	0	2.0	.7	1.1	1.5
Miles of Maintenance	0	56.3	52.1	34.9	30.2
Surface rocking	0	7.7	7.7	7.7	7.7
Road Brushing	0	3.4	2.6	2.6	2.6
Opening closed roads (miles)	0	17.8	17.2	7	6.4

Access to the harvest units would be accomplished mainly by temporary roads so not to extend the amount of roads needing yearly or periodic maintenance and retain hydrologic function on the landscape. The temporary roads are short-term roads, used for the harvest entry only, that will be allowed to revegetate after use. The roads are located on ridgetops, as for the access of skyline unit 30, or cross flat bench areas to access forwarder units. The temporary roads are distant to streams or intermittent drainages and would not impact water quality (see fisheries and water quality for additional discussions in Chapter 4). Impacts to water quality from harvest related actions are immeasurable.

The 0.2 miles of new road construction are extensions of existing roads; 0.1 mile of FR 6413520 to access additional area for skyline logging and the other 0.1 mile of FR 6231080 to change it to intersect with FR 6235 so FR 6231080 can be closed at the Forest boundary. The District ranger determined a roads analysis is not required because the temporary roads are for short-term access (likely not needed for 30 years) and the new construction are for minor extensions of existing roads and needed for future management.

Temporary road impacts to biodiversity and wildlife are no different than timber harvest and are short-term. The road surfaces would become vegetated and be similar in appearance to the harvest units. Monitoring of low impact temporary roads on the Walla Walla District has shown the surfaces to vegetate quickly, even while the road is being used. A 12-foot wide road surface does not fragment stands because vegetation would become reestablished and the reduction in crown closure would not be noticeable from the prescription for the stand. Since the temporary road would likely not be used for another 20 to 40 years, there would be no impacts from additional traffic into the area and any trees growing on the road surface would reach sapling stages and provide understory habitat.

There is still a potential for the spread of noxious weeds from trucks used for hauling timber or from daily access to the work site. Prevention measure in the project design reduces the risk. Retaining a canopy along with seeding the exposed road surface after use would reduce the risk for the establishment of noxious weeds. Logging and road construction equipment are required to be cleaned prior to coming on the District and have to remain clean of weed seeds. The control of weeds during an activity and the seeding with a vegetative cover would reduce the likelihood of new noxious weed infestations. See the discussion on noxious weeds in Chapter 4 for additional information.

6. There was a comment in favor of removing off-site pine in old plantations in order to protect the genetic integrity of the natural pines.

   Response: Do to problems in meeting Forest Plan soil Standards and Guidelines the removal of off-site pine from the old plantations was not carried forward in the Modified Proposed

Action. (See:Background and Purpose and need for the Action in Chapter 1 and changes to the proposed action in Chapter 2)

7. There was concern that limiting the diameter of trees to harvest would impact stand health by not allowing adequate treatment of stands with large, 21 inch diameter, trees showing "degenerative characteristics".

   Response: The timber harvest proposed in the Modified Proposed Action (Alternative B) includes removal of large trees in the Moist Forest type, which contains most of the timber harvest units. Large trees can be removed where necessary to meet forest health, disease, or growth objectives. The Dry forest type is below the Historical Range of Variation (HRV) for Old Forest Single Strata and the harvest of large trees is not proposed in this biophysical type unless an occasional hazard tree is remove for safety reasons.

8. There is concern about harvest and road construction in inventoried roadless, unroaded areas or areas adjacent to inventoried roadless areas. Also concern about roads, harvest or other developments adjacent to Wilderness.

   Response: There are no unroaded areas over 1,000 acres in the planning area. The Wenaha Tucannon Wilderness is adjacent to the planning Area along the North boundary but there are no activities taking place adjacent to the Wilderness. The Grande Ronde Inventoried Roadless Area is unique to the Planning Area. There is no harvest activity or roadwork proposed for this Inventoried Roadless area. Landscape prescribed fire is the only activity proposed within the Grande Ronde Inventoried Roadless Area and no harvest pretreatments would be used (Table B-3).

Table B-3. Actions that occur in, near, or adjacent to the Grande Ronde Inventoried Roadless Area.

Activities	Activities in Roadless	Activities adjacent to Roadless
Fire	Fuel Reduction Areas 4, 6, and 8 would have landscape fire in the Inventoried Roadless.	Reduction area 1 overlaps the Inventoried Roadless Area but no activities occur within or adjacent to the Inventoried Roadless Area. Hand thinning of non-commercial material would occur within 0.1 miles of the Roadless Area. Fuels Reduction Area 2 is within .1 mi. of the Roadless Area.
Roads	None	FR 6200 is adjacent to the Inventoried Roadless Area for .36 mi. in section 10. This road is proposed for surface rock replacement and would not impact roadless character. Forest Roads adjacent to the Roadless Area being used for haul include FR 6234052, FR 6230060 and FR 6234040; totaling 1.1 miles. Their would be a short-term impact (one to two months) to the roadless area caused by noise however it would likely go unnoticed because there is little recreational use of this roadless area. Road use would not impact roadless character.
Hand treatment of Fuels	Hand treatment of fuels and hand piling would take place in Fuels Reduction area 4 also hand construction of black lines for landscape prescribed fire treatments.	There would be short term impacts to visual quality by the fuel reduction activity lasting one to five years. Vegetation recovery would reduce 80 to 90 percent of the visual impacts the first year or two after treatments. Fire is a natural process on this landscape.

Activities	Activities in Roadless	Activities adjacent to Roadless
Harvest	None	Harvest Units 45, 73, 75A, and 75B are within .1 mi. of the Roadless Area. Harvest units 58, 60, and 78 are adjacent to Inventoried Roadless Area. The proposed thinning would not be noticed from within the Roadless Area and not impact roadless character.
Material Source	None	Material source on FR 6200390 in section 10 is .1 mi from the Inventoried Roadless Area. This source would be enlarged, and would require cutting some trees. The enlargement would not extend into the roadless area and not be viewed from the roadless area. Roadless character would not be impacted.

9. How will this proposed action contribute to sustainable conditions? "Management activities have concentrated largely in areas where tree diameters and volumes could support a timber sale as a means for treating fuels and reducing stocking levels. Prescribed burning is proposed to reduce fuel loading and to re-introduce fire as an ecological process – but how will this be maintained in the future since the goal of these activities is to return the land to a condition that is sustainable over time."

   Response – Most (60 percent of Alternative B, 69 percent Alternative C, and 71 percent of Alternative D and E) of the area to be treated does not involve timber harvest or mechanical treatments; fuel treatments would be by burning only. Four of the six Purpose and Need listed for the modified proposed action include forest health needs that require stocking control or commercial tree removal for other than fire related reasons. For example purpose and need #3 says,

   "Reduce stocking level to make stands more resistant to insect attacks and forest diseases, while maintaining the mixed species composition."

   These needs will continue in the future and can be met using multiple management prescriptions. The current action does not set in motion any future activity or management direction. Any future action would have to be covered by its own analysis, including public participation. Since social values change; the intent of the action is to preserve future options while maintaining forest health and processes. The fuel conditions proposed for the Dry Forest and grassland communities can be maintained by future prescribed fire or wildfires if future funding is available or the Forest Plan allows wildfire to be used for prescribed purposes.

10. Concern that natural fire needs to be allowed to play part in the restoration process.

    Response: It is unlikely that natural fire (let burn) instead of prescribed fire will be used on the slopes of the Grande Ronde in the near future because of the nearby private land, inadequate size, and steep topography. Here is a brief discussion by the Walla Walla Ranger District Fire Management Officer – Jim Beekman.

    "Fires originating from natural ignitions under certain conditions and in certain locations may be allowed to continue burning when resource benefits can be achieved. Before a natural ignition can be used to accomplish resource management goals it needs to be supported in the Forest Plan and Fire Management Plan. Weather, fuels, topography and risk can be used to guide the identification of locations where fire use may or may not be appropriate…."

The successful use of a natural fire ignition to accomplish resource goals depends on the fire perimeter being confined within areas identified as acceptable for fire use. Fires burning freely across the landscape can burn for long periods of time and cover large areas. A fire that occurs in mid season and continues to burn through much of the remainder of the season could be expected to spread to 50,000 acres. Fires burning under these conditions have exceeded 100,000 acres. Because of the potential size that a fire use event can reach, areas designated for fire use must be large with easy defendable natural breaks such as vegetation, geology, or ridge systems. Areas of 100,000 acres or more that have boundaries defined by existing defensible barriers may be good candidate locations for using natural ignitions to maintain the landscape.

Careful consideration should be given to holdings and improvements that could be threatened by fire. Protection of these features requires suppression forces and actions. Protection actions can be ***hazardous*** *because site or property boundaries seldom align with defensible natural barriers." (editors emphasis)*

A fire has to have a high probability of going out naturally without threatening holdings and improvements or fire fighter safety to be a let burn candidate. Any starts in the Grande Ronde valley would seldom meet these criteria.

11. There was concern that harvest treatments would negatively impact terrestrial and aquatic species through increased sedimentation.

    Response: Impacts to terrestrial and aquatic habitat is disclosed in Chapter 4 in the fisheries and wildlife sections. The analysis acknowledges negative impacts however they are small and consistent with Forest Plan Standards and Guidelines.

12. There was concern that an adequate soils analysis would be done.

    Response: Soil impacts are disclosed in Chapter 4. Harvest units were evaluated for residual impacts from any past harvest and any additional impacts to soils was estimated and added to the residual impacts to determine consistency with Forest Plan Standards and Guidelines.

13. It is not known if thinning mimics ecological effects for such things as nutrient recycling, hydrology, seed scarification, non-woody vegetation response, plant diversity, disease and insect infestation, and genetic diversity.

    Response: Impacts relating to soils, hydrology and vegetation have been disclosed in Chapter 4.

14. The proposal does not address access to fuel wood for home heating nor the impacts of the project on the quality and quantity of fuel wood.

    Response: In 2004 the Walla Walla District changed its firewood policy to allow firewood cutting within 300 feet of all open roads. The proposed harvest would do little to impact the availability of firewood. The road system would be closed to firewood gathering when the sale is active and would have minor removal or falling of trees that are hazards along the haul route. Some of the trees may be left on the ground and would become available for firewood cutting. The amount of roads temporarily closed to firewood cutting is small when compared to the total District open road miles. Most of the harvest activity is distant from the 300 feet available for woodcutting and would do little to impact available firewood. Merchantable cull pieces would be removed within units however there would remain a portion of the dead wood that would not provide usable fiber for manufactured wood

products but could still make firewood. Given the amount of dead wood currently available on the district and created each year by blowdown or snow damage, the small amounts of dead wood within harvest units would have little or no impact on available firewood and should keep pace with demand. Firewood cutters may have to shift to non-preferred tree species in some locations.

15. Ensure public participation.

Response: This is a normal part of the NEPA process: how and when it is to be done is included in the regulations for Implementing NEPA, 40 CFR Part 1501.7 Scoping and in 36 CFR 215 relating to comment periods and appeals

Appendix C – Units Summaries

Unit	Log Sys	Rx	Acres	Fuel Treatments	Structural Stage	Forest Plan Management Area	Fire Regime	Fuel Model	Condition Class	Alt B	Alt C	Alt D	Alt E
03	FO	HITH	25	SB	OFSS, UR	C4	I,III	8	1, 2	X	X		
08	FO	HITH	29	SB	UR	C4	I, III	9	1, 2	X	X		
12	FO	HITH	29	JP	UR	C4/E2	III	8	1	X	X	X	
13	FO	HITH/HSEG	15	JP	YFMS	C4/E2	III	10	3	X	X	X	
14	FO	HITH	39	JP	SECC	C4/E2	III	2	1	X	X	X	
15	FO	HSEG	24	JP	OFMS	E2	III	2	1	X			
17	FO	HSEG	52	JP	OFMS	E2	III	2	1	X			
18	FO	HSEG	4	JP	YFMS	E2	III	8	2	X	X		
19	FO	HITH	9	SB	YFMS	E2	III	8	2	X	X		
20	FO	HITH	33	JP	OFMS/OFSS	E2	III	8	1	X			
21	SH	HITH	5	YUM	YFMS	C4	III	2	1, 3	X	X		
22	SH	HITH	11	YUM	YFMS	C4	III	2	1	X	X		
23	FO	HITH	16	SB	UR	E2	III	10	3	X	X		
24	FO	HITH	21	JP	OFMS	E2	III	8	1	X			
27	FO	HITH	9	SB	SECC	C4	III	8	1	X	X		
29	FO	HITH/HIIM	15	SB	YFMS	E2	III	8	1	X	X		
30	SH	HITH	47	JP	SECC	E2	III	8	1	X	X		
31	FO	HITH	11	SB	SEOC	E2	III	8	1	X	X	X	
32	FO	HITH	21	SB	YFMS	E2	III	8	2	X	X		
33	FO	HITH	21	SB	YFMS	E2	III	8	1	X	X		
35	FO	HITH	18	SB	SECC	E2	III	8	1	X	X		
38	FO	HITH	10	SB	UR	E2	III	8	1	X	X		
39	FO	HITH	6	SB	YFMS	E2	III	8	1	X	X		
40	FO	HITH	29	SB	OFMS/YFMS	E2	III	8	1	X	X		
43	FO	HITH	73	SB	OFMS	C4/E2	III	10	3	X		X	X
45	FO	HITH	112	JP	SECC	C4/E2	III	2	1	X	X	X	X
46	FO	HITH/HIIM	11	SB	OFMS	C4	III	2	1	X		X	X
47	FO	HITH/HIIM	50	SB	OFMS	C4	III	2	2	X		X	X
48	FO	HSSW/HITH	3	SB	YFMS	E2	III	2	1	X	X	X	X
49	FO	HSSW/HITH	8	SB	YFMS	E2	III	2	1	X	X	X	X
50	FO	HITH/HSEG	30	SB	UR	E2	III	2	1	X	X	X	X
51	FO	HIIM/ HSEG	30	UB/JP	OFMS/YFMS	E2	III	2	1	X	X	X	X
58	FO	HSSW/HITH	40	SB	OFSS/SEOC	C4	III	2	1	X	X	X	X
60	FO	HITH	95	SB	SECC	C4/E2	III	8	1	X	X	X	X
61	FO	HITH	64	SB	SEOC	C4/E2	III	8	1	X	X	X	X
62	FO	HITH	25	SB	SEOC	E2	III	9	1	X	X	X	X
63	FO	HITH	83	SB	SEOC	C4/E2	III	2	1	X	X	X	X
64	FO	HITH	47	SB	SEOC	E2	III	8	1	X	X	X	X
65	FO	HITH	52	SB	YFMS	E2	III	8	1	X	X	X	X
66	FO	HITH	37	SB	SEOC	E2	V	9	2	X	X	X	X
67	FO	HITH	95	SB	OFMS	E2	III	8	1	X			

Unit	Log Sys	Rx	Acres	Fuel Treatments	Structural Stage	Forest Plan Management Area	Fire Regime	Fuel Model	Condition Class	Alt B	Alt C	Alt D	Alt E
69	FO	HSSW	10	UB/JP	UR	C4	I	9	2	X	X	X	X
72	FO	HITH/HIIM	3	UB	SECC	C4	V	9	2	X	X	X	X
73	SH	HITH/HIIM	11	UB	SECC	C4	I, V	8	2	X	X	X	X
74	FO	HITH/HIIM	37	SB	OFSS	C4	III	8	1	X		X	X
75A	FO	HSEI	19	JP	YFMS	C4	III	2	1	X	X	X	X
75B	FO	HITH/HSEI	71	SB	YFMS	C4	III	2	1	X	X	X	X
78	SH	HITH/HIIM	10	UB	SECC	C4	I	8	2	X	X	X	X
79	FO	HSEG	26	JP	OFMS	E2	III	8	1	X			X
80	FO	HITH/HIIM	65	SB	OFMS	E2	III	8	1	X			X
81	FO	HITH/HIIM	32	SB	YFMS	E2	III	8	1	X	X		
84	FO	HSEG	13	SB	SEOC	E2	III	8	1	X	X		
85	FO	HITH/HSEI	55	SB	SEOC	C4	III	2	1	X	X	X	X
86	FO	HSEG	11	JP	OFMS	E2	III	2	1	X			
89	FO	HSSW/ HSST	20	UB/JP	SEOC	C4	III	2	1	X	X	X	X
90	FO	HITH/ HSEG	54	JP/SB	OFMS/UR	E2	III	10	3	X			
110	FO	HITH/ HSEG	21	SB	SEOC	E2	III	8	1	X	X		X

Appendix D - Marking Guides

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Unit	LOG SYS	Gross Acres	Net Acres	RX	Number of Leave Trees	*Old Forest?	Dry Forest?	Regeneration Harvest Rx?	OK to cut mistletoed or dying 21" trees?	Notes	Est. # of groups cut	Ac where >21" could be cut	Est. TPA >21" cut	Est. # Trees >21" cut
3	FO	25	25	HITH	100 - 120 sq. ft. BA/acre	no	yes	no	no		na	0		0
8	FO	29	29	HITH	150 - 170 sq. ft. BA/acre	no	no	no	no		na	0		0
12	FO	29	29	HITH	120 - 140 sq. ft. BA/acre	no	no	no	no		na	0		0
13	FO	15	11	HITH/HSEG	120 - 140 sq. ft. BA/acre / 80%	no	no	partly: patches regenerated	see notes	***The group selection is for patches of mistletoed larch. The rest of the unit should be thinned. Mistletoe-infected trees (including those >=21" DBH) within 50' of the group selection boundaries should be removed.***	3	11	1 per 5 acres	3
14	FO	39	39	HITH	120 - 140 sq. ft. BA/acre	no	no	no	no		na	0		
15	FO	24	5	HSEG	80%	yes	no	patches regenerated	no	Mistletoe-infected trees **(< 21" DBH)** within 50' of the group selections should be removed.	4	0	0	0
17	FO	52	10	HSEG	80%	yes	no	patches regenerated	no	Mistletoe-infected trees **(< 21" DBH)** within 50' of the group selections should be removed.	7	0	0	0
18	FO	4	1	HSEG	80%	no	no	patches regenerated	see notes	Mistletoe-infected trees (including those >= 21" DBH) within 50' of the group selection boundaries should be removed.	2	1.45	1 per 5 acres	1
19	FO	9	9	HITH	120 - 140 sq. ft. BA/acre	no	no	no	no		na	0		
20	FO	33	33	HITH	130 - 150 sq. ft. BA/acre	yes	no	no	no		na	0		
21	SH	5	5	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
22	SH	11	11	HITH	110 - 130 sq. ft. BA/acre	no	no	no	no		na	0		
23	FO	16	16	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
24	FO	21	21	HITH	110 - 130 sq. ft. BA/acre	yes	no	no	no		na	0		
27	FO	9	9	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
29	FO	15	15	HITH/HIIM	130 - 150 sq. ft. BA/acre	no	no	no	yes	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	15	1 per 5 acres	3
30	SH	47	47	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
31	FO	11	11	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
32	FO	21	21	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
33	FO	21	21	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
35	FO	18	18	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
38	FO	10	10	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
39	FO	6	6	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
40	FO	29	29	HITH	130 - 150 sq. ft. BA/acre	area SE of road	no	no	no		na	0		
43	FO	73	73	HITH	150 - 170 sq. ft. BA/acre	yes	no	no	no		na	0		
45	FO	112	112	HITH	120 - 140 sq. ft. BA/acre	no	no	no	no		na	0		

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Unit	LOG SYS	Gross Acres	Net Acres	RX	Number of Leave Trees	*Old Forest?	Dry Forest?	Regeneration Harvest Rx?	OK to cut mistletoed or dying 21" trees?	Notes	Est. # of groups cut	Ac where >21" could be cut	Est. TPA >21" cut	Est. # Trees >21" cut
46	FO	11	11	HITH/HIIM	120 - 140 sq. ft. BA/acre	yes	no	no	no	***Unit 46 was made smaller, so it might make the most sense to combine it with Unit 47. Both units are partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.***	na	0		
47	FO	50	50	HITH/HIIM	100 - 120 sq. ft. BA/acre	yes	no	no	no	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	0		
48	FO	3	3	HSSW/HITH	12 to 15 TPA / 130 - 150 sq. ft. BA/acre	no	no	partly	yes	***See unit map for where HSSW and HITH Rxs go.***	na	3	1 per 5 acres	1
49	FO	8	8	HSSW/HITH	12 to 15 TPA / 130 - 150 sq. ft. BA/acre	no	no	partly	yes	***See unit map for where HSSW and HITH Rxs go.***	na	8	1 per 5 acres	2
50	FO	30	30	HITH/HSEG	130 - 150 sq. ft. BA/acre / 80%	no	no	partly: patches regenerated	see notes	Put group selections where the trees are least healthy, and thin the rest of the stand. Mistletoe-infected trees (including those >= 21" DBH) within 50' of the group selections should be removed.	5	15	1 per 5 acres	3
51	FO	30	18	HIIM/HSEG	130 - 150 sq. ft. BA/acre / 80%	north half	no	partly: patches regenerated	no	***See unit map for where HIIM and HSEG Rxs go.***	12	0		
58	FO	40	40	HSSW/HITH	12 to 15 TPA / 100 - 120 sq. ft. BA/acre	no	no	partly	yes		na	40	1 per 5 acres	8
60	FO	95	95	HITH	130 - 150 sq. ft. BA/acre	no	no	no	no		na	0		
61	FO	64	64	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
62	FO	25	25	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
63	FO	83	83	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
64	FO	47	47	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
65	FO	52	52	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
66	FO	37	37	HITH	100 - 120 sq. ft. BA/acre	no	no	no	no		na	0		
67	FO	95	95	HITH	130 - 150 sq. ft. BA/acre	yes	no	no	no		na	0		
69	FO	10	10	HSSW	12 - 15 TPA	no	no	yes	yes		na	10	1 per 5 acres	2
72	FO	3	3	HITH/HIIM	80 - 100 sq. ft. BA/acre	no	yes	no	no	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	0		
73	SH	11	11	HITH/HIIM	80 - 100 sq. ft. BA/acre	no	yes	no	no	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	0		

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Unit	LOG SYS	Gross Acres	Net Acres	RX	Number of Leave Trees	*Old Forest?	Dry Forest?	Regeneration Harvest Rx?	OK to cut mistletoed or dying 21" trees?	Notes	Est. # of groups cut	Ac where >21" could be cut	Est. TPA >21" cut	Est. # Trees >21" cut
74	FO	37	37	HITH/HIIM	110 - 130 sq. ft. BA/acre	yes	no	no	no	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	0		
75a	FO	19	19	HSEI	110 - 130 sq. ft. BA/acre	no	yes	no	no	*I need to revisit this unit before finishing the Rx.*	na	0		
75b	FO	71	71	HITH/HSEI	100 - 120 sq. ft. BA/acre	no	no	no	no	*I need to revisit this unit before finishing the Rx.*	na	0		
78	SH	10	10	HITH/HIIM	80 - 100 sq. ft. BA/acre	no	yes	no	no	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	0		
79	FO	26	5	HSEG	80%	yes	no	patches regenerated	no	Mistletoe-infected trees **(< 21" DBH)** within 50' of the group selections should be removed.	4	7.25	1 per 5 acres	2
80	FO	65	65	HITH/HIIM	100 - 120 sq. ft. BA/acre	yes	no	no	no	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	0		
81	FO	32	32	HITH/HIIM	100 - 120 sq. ft. BA/acre	no	no	no	yes	This unit is partly HIIM (Improvement Cut) because of patches of diseased or damaged trees. The prescribed BA/acre should be left, but the stand may be patchy where diseased trees are removed. The rest of the unit should be thinned.	na	32	1 per 5 acres	6
84	FO	13	3	HSEG	80%	no	no	patches regenerated	see notes	Mistletoe-infected trees (including those >= 21" DBH) within 50' of the group selection boundaries should be removed.	3	4.35	1 per 5 acres	1
85	FO	55	55	HITH/HSEI	100 - 120 sq. ft. BA/acre	no	no	no	no	***See unit map for where HITH and HSEI Rxs go.***	na	0		
86	FO	11	3	HSEG	80%	yes	no	patches regenerated	no	Mistletoe-infected trees **(< 21" DBH)** within 50' of the group selections should be removed.	3	0		0
89	FO	20	20	HSSW/HSST	12 - 15 TPA / 6 - 12 TPA	no	no	yes	yes	Where possible without leaving heavily mistletoed trees, leave enough trees for a shelterwood (12 - 15 TPA). Where the mistletoe is bad, leave enough for a seed-tree cut (6 - 12 TPA), with the leave trees in clumps.	na	20	1 per 5 acres	4
90	FO	54	54	HITH/HSEG	130 - 150 sq. ft. BA/acre / 80%	partly	no	partly: patches regenerated	no	The group selection is for a patch of mistletoed larch near the top of the hill. The rest of the unit should be thinned. Trees >= 21" cannot be cut because part of the unit is Old Forest.	1			
110	fo	21	10	HITH/HSEG	100 - 120 sq. ft. BA/acre / 80%	no	no	partly: patches regenerated	see notes	***See unit map for where HITH and HSEG Rxs go.***	6	14.5	1 per 5 acres	3
Total		*1,812*	*1,682*									*182*		*39*

Appendix E – Best Management Practices

MONITORING AND MITIGATION

BMP's and Contract "C" clauses will be included to insure minimal ground disturbance and to provide adequate mitigation (see Appendix A). Effectiveness/implementation monitoring will be performed by TMA/resource personnel (the presale technician will assure BMPs are met during sale preparation and the sale administrator will assure BMPs are met during timber sale operations). Forwarding- mechanical harvesting systems will be utilized to protect soils from excessive disturbance. Regional Standards require that C clause C6.6# be included to prevent adverse cumulative soil impacts (<15%) and protect soils. Logging slash and large wood should be left and scattered on forwarder trails, landings and throughout the harvested area to meet Forest Plan Guidelines.

Appendix A

Specific resource protection measures and mitigation's listed below would be implemented in any action alternative. These resource protection measures and mitigation's are consistent with the Umatilla National Forest LRMP standards and guidelines. The general discussion of Best Management Practices (BMP's) are found in the General Water Quality Best Management Practices, Pacific N.W. Region, 1988. BMP's and resource protection measures are identified below, as well as an estimation of the ability to implement BMPS's, their anticipated effectiveness, timing and responsibility for monitoring.

1. Maintain all Riparian Habitat Conservation Areas (RHCAs), with no removal of timber from these areas. PACFISH provides default standard widths for RHCAs based on one of four categories: fish bearing; perennial, non-fish bearing; ponds, lakes, wetlands greater than 1 acre; and intermittent or small wetlands. The following standard widths, applied to each side of the stream, define the RHCAs for this project:

   Category 1 - **Fish-bearing streams**: RHCA's consist of the stream and the area on either side of the stream extending 300 feet slope distance from the edges of the active stream channel, regardless of Forest Type.

   Category 2 - **Perennial non-fish-bearing streams**: RHCA's consist of the stream and the area on either side of the stream extending 150 feet slope distance from the edges of the active stream channel, regardless of Forest Type.

   Category 3 - **Ponds, lakes, reservoirs, and wetlands greater than 1 acre**: RHCA's consist of the body of water or wetland and the area extending 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, regardless of Forest Type.

   Category 4 - **Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas:** This category includes features with high variability in size and site-specific characteristics, and assumes listed stock. At a minimum the RHCA's must include: the area from the edges of the stream channel, wetland, landslide, or land-slide prone area to a distance equal to 150 feet for Moist Forest, 120 feet for Dry Forest, and 100 feet for Cold Forest Types.

   In the GIS stream layer, Class I and II streams are Category 1, Class III streams are Category 2, and Class IV streams are Category 4.

2. Follow PACFISH standards and guidelines in RHCAs.

   - TM-1 Prohibit timber harvest, including firewood cutting in RHCAs.

- RF-3 Determine the influence of each road on the Riparian Management Objectives (RMOs). Meet RMOs and avoid adverse effects on listed anadromous fish.
- RF-5 Provide and maintain fish passage at all road crossings of existing and potential fishbearing streams.
- FM-1 Design fuel treatments and fire suppression strategies, practices and actions so as to not prevent attainment of RMOs, and to minimize disturbance of riparian ground cover and vegetaiton. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel managment actions a could perpetuate or be damaging to long-term ecosystem function, listed anadromous fish, or designated critical habitat.
- FM-4 Design prescribed burn projects and prescriptions to contibute to the attainment of the RMOs.

3. Design harvest systems to minimize crossing stream channels and ephemeral draws. All drainage crossings, including ephemeral draws, are to be approved on the ground by the Sale Administrator in consultation with the Hydrologist.
4. Ephemeral stream channels should have protections to minimize equipment disturbance of duff and soil, and should not be used as skid trails, landing sites, or as road locations. Ephemeral draws, not within RHCAs, are to meet the following down wood requirements to reduce risk of upward migration and channel initiation: retain all wood embedded in the soil; retain at least 5 pieces of wood >12" diameter and >20' in length per 1000' of draw bottom (average 1 piece per 200'); retain at least 20 pieces of wood >6" diameter and >10' in length per 1000' of draw bottom (average 1 piece per 50'). Ephemeral draws with a gradient of 5% or more will need to be visited by the hydrologist to determine if any additional site specific mitigation is required.
5. All temporary roads and landings shall be obliterated at the completion of their intended use (see BMP R-23) - NFMA requires that all temporary roads be returned to resource production within 10 years. Reclose all roads, with sufficient drainage structures, which are opened for project activities. For all temporary roads:
    - obliterate as soon as feasible after use
    - season of use shall be specified to minimize rutting, erosion, sedimentation, and water concentrations
    - plan, locate, design, and construct temporary roads with ease of obliteration as a priority - stockpile topsoil and duff for re-shaping after use or obliteration
    - horizontal and vertical alignments should conform to the natural contour as closely as possible - outsloped rolls in the grade effectively break up water concentrations during use and can be crafted into silt traps and planting pockets during obliteration
6. Wet meadows and dry meadows or scabrock flats would not be skidded across or have landings located within them, unless approved by the Sale Administrator. BMP VM-2,
7. The following BMP's are identified for the timber sale portion of the project, along with an estimation of the ability to implement them, as well as their anticipated effectiveness, timing and responsibility for monitoring.

T-1 - Timber Sale Planning Process

Estimates will be made on the potential changes to water quality and instream beneficial uses.

- Responsibility: Hydrologist and Fisheries Biologist
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

T-2 - Timber Harvest Unit Design

Unit design will ensure favorable conditions of water flow, water quality, and fish habitat through PACFISH RHCAs.

- Responsibility: Hydrologist and Fisheries Biologist
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

T-4 - Use of Sale Area Maps for Designating Water Quality Protection Needs

The Sale Area Map will include locations of streams to be protected and the required harvest method (ephemeral draws would be protected during forwarder route design, but not under the protected stream course provision).

- Responsibility: Presale Technician
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

T-8 - Streamcourse Protection (Implementation and Enforcement)

Location, method and timing of streamcourse crossing will be agreed upon in advance by the Forest Service and Purchaser.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

T-10 - Log Landing Location

Harvest plans will include proposed landing locations. Landing locations and size will be approved by the Forest Service in advance.

- Responsibility: Presale Technician and Sale Administrator
- Timing: Prior to and during activity
- Ability to Implement: High
- Effectiveness: High

T-11 – Yarding and Skidding Trail Location and Design

Harvest plans will include proposed yarding patterns. Trails will be approved in advance by Forest Service personel.

- Responsibility: Presale Technician and Sale Administrator
- Timing: Prior to and during activity
- Ability to Implement: High
- Effectiveness: High

T-12 - Suspended Log Yarding in Timber Harvesting

Full suspension will occur where forwarder and helicopter logging is required and partial suspension will occur where skyline logging is required so as to create minimal soil disturbance.

- Responsibility: Presale Technician and Sale Administrator
- Timing: Prior to and during activity
- Ability to Implement: High
- Effectiveness: High

T-13 - Erosion Prevention Measures During Timber Sale Operations

Equipment shall not operate when ground conditions are susceptible to detrimental soil disturbances (not more than 15% of the logged area is permitted to have detrimental soil disturbance). Erosion control work will be kept current.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

T-14 - Revegetation of Areas Disturbed by Harvest Activities

The TSC will include provisions for seeding and fertilizing severely disturbed areas. The Forest Service will designate disturbed areas where seeding and fertilizing are required (generally landing and temporary roads or other areas where more than 200 sq. ft. of exposed mineral soil due to harvest operations).

- Responsibility: Presale Technician and Sale Administrator
- Timing: Prior to and during activity
- Ability to Implement: High
- Effectiveness: Moderate

T-15 - Log Landing Erosion Prevention and Control

The Forest Service will designate areas for landing scarification and erosion control seeding as well as any necessary water bars or other drainage structures.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

T-18 - Erosion Control Structure Maintenance

The Purchaser will provide maintenance of soil erosion control structures as required in the TSC.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: Moderate
- Effectiveness: High

T-19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

The effectiveness of erosion control measures will be evaluated periodically during the life of the TSC.

- Responsibility: Sale Administrator and Hydrologist
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

T-20 - Reforestation

Suitable land will be reforested within five years of harvest.

- Responsibility: Reforestation Technician
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

T-21 - Servicing and Refueling of Equipment

The Forest Service will designate refueling and servicing areas. A Spill Prevention Control and Countermeasures Plan is required if on site fuel storage exceeds 660 gallons in a single container or if total storage exceeds 1320 gallons.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

R-1 - General Guidelines for the Location and Design of Roads

Road reconstruction will assure design creates minimal resource damage.

- Responsibility: Engineering Technician
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

R-2 - Erosion Control Plan

Limit erosion and sedimentation through effective planning and contract administration.

- Responsibility: Engineering Technician
- Timing: Prior to and during activity
- Ability to Implement: High
- Effectiveness: Moderate

R-3 - Timing of Construction Activities

Road reconstruction will occur during minimal runoff periods to minimize erosion.

- Responsibility: Engineering Technician
- Timing: During activity
- Ability to Implement: High
- Effectiveness: Moderate

R-6 & R-7 - Dispersion of Subsurface and Surface Drainage Associated with Roads

Ditch relief and cross drainage will assure intercepted ground water and surface water is moved from road prism before it develops enough energy to undermine cut slopes or erode fill slopes.

- Responsibility: Engineering Technician
- Timing: During activity
- Ability to Implement: High
- Effectiveness: Moderate

R-18 - Maintenance of Roads

Ditches and culverts will be kept open and ruts repaired.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

R-19 - Road Surface Treatment to Prevent Loss of Material

Watering and grading will be kept on schedule to assure surface material is not lost.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

R-20 - Traffic Control During Wet Periods

Haul and other associated traffic will be controlled when road damage is likely to occur due to road/weather conditions.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

R-21 - Snow Removal Controls to Avoid Resource Damage

Snow removal will assure water can drain from road prism before it develops enough energy to erode road surface or fill slopes.

- Responsibility: Sale Administrator
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

R-22 - Restoration of Borrow Pits and Quarries

Borrow Pits will be stabilized such that banks are stable and access road provides necessary drainage.

- Responsibility: Engineering Technician
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

R-23 - Obliteration of temporary roads and landings

Temporary roads and landings will be obliterated at the completion of their intended use to reduce chronic sediment sources and restore productivity. Effective obliteration is generally achieved through a combination of the following measures: temporary culverts and bridges removed and natural drainage configuration reestablished, road surface ripped, sideslopes reshaped and stabilized, road effectively drained and blocked, road returned to resource production through revegetation (grass, browse, or trees).

- Responsibility: Sale Administrator, with advice from hydrologist
- Timing: At the completion of activity
- Ability to Implement: High
- Effectiveness: High

F-1 - Fire and Fuel Management Activies

Activity related fuel will be managed to assure the risk of wildfire is not increased. The timber sale contract will be utilized to ensure that LRMP standards and guidelines for down woody material are met without necessitating additional impacts due to use of machinery. Some slash should be retained on the forwarder trails to reduce the chances of erosion, to trap sediment, and to provide nutrients to the soils for productivity.

- Responsibility: Fire Management Officer
- Timing: During activity
- Ability to Implement: High
- Effectiveness: High

F-2 - Consideration of Water Quality in Formulating Prescribed Fire Prescriptions

The prescribed fire plan will be developed to assure fire mortality does not exceed 10% of the tree canopy or remove effective ground cover from more than 20% of the burn area. Fire ignitions will not occur within RHCAs.

- Responsibility: Fire Management Officer
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

F-3 - Protection of Water Quality During Prescribed Fire Operations

The prescribed fire will follow the burn plan. Adjustments will be made during firing operations if objectives are not being met.

- Responsibility: Fire Management Officer
- Timing: Prior to and during activity
- Ability to Implement: High
- Effectiveness: High

W-5 - Cumulative Watershed Effects

To ensure that the additional effects of the proposed management activities, when added to the existing conditions, do not exceed thresholds of concern or result in adverse (degraded) water quality or channel/fish habitat conditions.

- Responsibility: Hydrologist
- Timing: Prior to activity
- Ability to Implement: High
- Effectiveness: High

Appendix F - Lynx Standards and Guidelines

1. All Programs and Activities

1.1. Programmatic

1.1.1. Objectives

Design vegetation management strategies that are consistent with historical succession and disturbance regimes. The broad-scale strategy should be based on a comparison of historical and current ecological processes and landscape patterns, such as age-class distributions and patch size characteristics. It may be necessary to moderate the timing, intensity, and extent of treatments to maintain all required habitat components in lynx habitat, to reduce human influences on mortality risk and interspecific competition, and to be responsive to current social and ecological constraints relevant to lynx habitat.

To sustain lynx populations through time, maintain or enhance the snowshoe hare prey base by providing vegetation with dense horizontal cover.

1.1.2. Standards

Management direction will generally apply only to lynx habitat on federal lands within Lynx Analysis Units (LAUs).

Lynx habitat will be mapped using criteria specific to each geographic area to identify appropriate vegetation and environmental conditions. Primary vegetation includes those types necessary to support lynx reproduction and survival. It is recognized that other vegetation types that are intermixed with the primary vegetation will be used by lynx, but are considered to contribute to lynx habitat only where associated with the primary vegetation.

To facilitate project planning, delineate LAUs. To allow for assessment of the potential effects of the project on an individual lynx, LAUs should be at least the size of area used by a resident lynx and contain sufficient year-round habitat.

To be effective for the intended purposes of planning and monitoring, LAU boundaries will not be adjusted for individual projects, but must remain constant.

Prepare a broad-scale assessment of landscape patterns that compares historical and current ecological processes and vegetation patterns, such as age-class distributions and patch size characteristics. In the absence of guidance developed from such an assessment, limit disturbance within each LAU as follows: if more than 30 percent of lynx habitat within a LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities by federal agencies.

1.1.3. Guidelines

The size of LAUs should generally be 16,000 - 25,000 acres (25-50 square miles) in contiguous habitat, and likely should be larger in less contiguous, poorer quality, or naturally fragmented habitat. Larger units should be identified in the southern portions of the Northern Rocky Mountains Geographic Area (Oregon, and SE Washington). In the west, we recommend using watersheds (e.g., 6th code hydrologic unit codes (HUCs) in more northerly portions of geographic areas, and 5th code HUCs in more southerly portions). Coordinate delineation of LAUs with adjacent administrative units and state wildlife management agencies, where appropriate.

Areas with only insignificant amounts of lynx habitat may be discarded, or lynx habitat within the unit incorporated into neighboring LAUs. Based on studies at the southern part of lynx range in the western U.S., it appears that at least 6,400 acres (10 square miles) of primary vegetation should be present within

each LAU to support survival and reproduction. The distribution of habitat across the LAU should consider daily movement distances of resident females (typically up to 3-6 miles).

After LAUs are identified, their spatial arrangement should be evaluated. Determine the number and arrangement of contiguous LAUs needed to maintain lynx habitat well distributed across the planning area.

1.2. Project

1.2.1. Standards

Within each LAU, map lynx habitat. Identify potential denning habitat and foraging habitat (primarily snowshoe hare habitat, but also habitat for important alternate prey such as red squirrels), and topographic features that may be important for lynx movement (major ridge systems, prominent saddles, and riparian corridors). Also identify non-forest vegetation (meadows, shrub-grassland communities, etc.) adjacent to and intermixed with forested lynx habitat that may provide habitat for alternate lynx prey species.

Within a LAU, maintain denning habitat in patches generally larger than 5 acres, comprising at least 10 percent of lynx habitat. Where less than 10 percent denning habitat is currently present within a LAU, defer any management actions that would delay development of denning habitat structure.

Maintain habitat connectivity within and between LAUs.

2. Timber Management

2.1. Programmatic

2.1.1. Objectives

Evaluate historical conditions and landscape patterns to determine historical vegetation mosaics across landscapes through time. For example, large infrequent disturbance events may have been more characteristic of lynx habitat than small frequent disturbances.

Maintain suitable acres and juxtaposition of lynx habitat through time. Design vegetation treatments to approximate historical landscape patterns and disturbance processes.

If the landscape has been fragmented by past management activities that reduced the quality of lynx habitat, adjust management practices to produce forest composition, structure, and patterns more similar to those that would have occurred under historical disturbance regimes.

2.2. Project

2.2.1. Objectives

Design regeneration harvest, planting, and thinning to develop characteristics suitable for snowshoe hare habitat.

Design project to retain/enhance existing habitat conditions for important alternate prey (particularly red squirrel).

2.2.2. Standards

Management actions (e.g., timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.

Following a disturbance, such as blowdown, fire, insects/pathogens mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres. Exceptions to this include:

- Areas such as developed campgrounds; or
- LAUs where denning habitat has been mapped and field validated (not simply modeled or estimated), and denning habitat comprises more than 10% of lynx habitat within a LAU.

In these cases, salvage harvest may occur, provided that at least the minimum amount is maintained in a well-distributed pattern.

In lynx habitat, pre-commercial thinning will be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack).

In aspen stands within lynx habitat in the Northern Rocky Mountains Geographic Areas, apply harvest prescriptions that favor regeneration of aspen.

2.2.3. Guidelines

Plan regeneration harvests in lynx habitat where little or no habitat for snowshoe hare is currently available, to recruit a high density of conifers, hardwoods, and shrubs preferred by hares. Consider the following:

- Design regeneration prescriptions to mimic historical fire (or other natural disturbance) events, including retention of fire-killed dead trees and coarse woody debris;
- Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape. Evaluate the potential of riparian zones, ridges, and saddles to provide connectivity; and
- Provide for continuing availability of foraging habitat in proximity to denning habitat.

In areas where recruitment of additional defining habitat is desired, or to extend the production of snowshoe hare foraging habitat where forage quality and quantity is declining due to plant succession, consider improvement harvests (commercial thinning, selection, etc). Improvement harvests should be designed to:

- Retain and recruit the understory of small diameter conifers and shrubs preferred by hares;
- Retain and recruit coarse woody debris, consistent with the likely availability of such material under natural disturbance regimes; and
- Maintain or improve the juxtaposition of denning and foraging habitat.

Provide habitat conditions through time that support dense horizontal understory cover, and high densities of snowshoe hares. This includes, for example, mature multi-storied conifer vegetation in the west. Focus vegetation management, including timber harvest and use of prescribed fire, in areas that have potential to improve snowshoe hare habitat (dense horizontal cover) but that presently have poorly developed understories that have little value to snowshoe hares.

3. Fire Management

3.1. Programmatic

3.1.1. Objectives

Restore fire as an ecological process. Evaluate whether fire suppression, forest type conversions, and other forest management practices have altered fire regimes and the functioning of ecosystems.

Revise or develop fire management plans to integrate lynx habitat management objectives. Prepare plans for areas large enough to encompass large historical fire events.

Use fire to move toward landscape patterns consistent with historical succession and disturbance regimes. Consider use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process.

Adjust management practices where needed to produce forest composition, structure, and patterns more similar to those that would have occurred under historical succession and disturbance regimes.

Design vegetation and fire management activities to retain or restore denning habitat on landscape settings with highest probability of escaping stand-replacing fire events. Evaluate current distribution, amount, and arrangement of lynx habitat in relation to fire disturbance patterns.

3.2. Project

3.2.1. Objectives

Use fire as a tool to maintain or restore lynx habitat.

When managing wildland fire, minimize creation of permanent travel ways that could facilitate increased access by competitors.

3.2.2. Standards

In the event of a large wildfire, conduct a post-disturbance assessment prior to salvage harvest, particularly in stands that were formerly in late successional stages, to evaluate potential for lynx denning and foraging habitat.

Design burn prescriptions to regenerate or create snowshoe hare habitat (e.g., regeneration of aspen and lodgepole pine).

3.2.3. Guidelines

Design burn-prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.

Design burn prescriptions to retain or encourage tree species composition and structure that will provide habitat for red squirrels or other alternate prey species.

Consider the need for pre-treatment of fuels before conducting management ignitions.

Avoid constructing permanent firebreaks on ridges or saddles in lynx habitat.

Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities.

Design burn prescriptions and, where feasible, conduct fire suppression actions in a manner that maintains adequate lynx denning habitat (10% of lynx habitat per LAU).

6. Forest Roads and Trails

6.1. Programmatic

6.1.1. Objectives

Maintain the natural competitive advantage of lynx in deep snow conditions.

6.1.2. Standards

On federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. Winter logging activity is not subject to this restriction.

6.1.3. Guidelines

Determine where high total road densities (>2 miles per square mile) coincide with lynx habitat, and prioritize roads for seasonal restrictions or reclamation in those areas.

Minimize roadside brushing in order to provide snowshoe hare habitat.

Locate trails and roads away from forested stringers.

Limit public use on temporary roads constructed for timber sales. Design new roads, especially the entrance, for effective closure upon completion of sale activities.

Minimize building of roads directly on ridgetops or areas identified as important for lynx habitat connectivity.

Appendix G – HRV Analysis

Consistency of Proposed Actions with Umatilla Forest Plan Amendments #10 and #11, "Eastside Screens"

Summary:

Umatilla National Forest Plan (FP) Amendments #10 and #11 ("The Eastside Screens") require that certain categories of timber sales be screened to evaluate their potential impact on riparian habitat, historical vegetation patterns, and wildlife fragmentation and connectivity.

The riparian screen will be met by implementing the PACFISH riparian habitat conservation area requirements.

In Cold Upland Forest, no harvest is proposed.

In Moist Upland Forest, harvest is allowed in late and old structure because the amount of LOS is above the historical range. The Ecosystem and Wildlife screens are met because all stands entered for harvest are less than 100 acres each, and the requirements for LOS connectivity, snag and down wood habitat, and goshawk are met.

In Dry Upland Forest, one type of LOS is below the historic range. The Ecosystem and Wildlife screens are met because no harvest will occur within late or old structure (LOS) stands, and no trees greater than or equal to 21" dbh will be harvested in other stand structures. The requirements for LOS connectivity, snag and down wood habitat, and goshawk are met.

The following table shows the proposed harvest prescriptions for the various stand structure types in the Lower Sheep project.

Table G-1. Proposed Prescriptions by Forest Stand Structure

Structure	PVG	Proposed Prescriptions	Acres
OFMS	Moist Upland Forest	Commercial Thinning, Improvement Cut, Group Selection	486
OFSS	Moist Upland Forest	Commercial Thinning, Improvement Cut	85
YFMS	Dry and Moist Upland Forest	Commercial Thinning, Improvement Cut, Group Selection, Shelterwood Cut	322
UR	Dry and Moist Upland Forest	Commercial Thinning, Group Selection, Shelterwood Cut	175
SECC	Dry and Moist Upland Forest	Commercial Thinning, Improvement Cut, Individual Tree Selection	344
SEOC	Dry and Moist Upland Forest	Commercial Thinning, Individual Tree Selection, Group Selection, Shelterwood Cut, Seed Tree Cut	391
SI (slivers)	Dry and Moist Upland Forest	Commercial Thinning, Individual Tree Selection	9
		TOTAL	1,812

Ecosystem Standard

The ecosystem standard requires a landscape-level assessment of vegetation conditions, including an analysis of the HRV of forest stand structural classes (also referred to as stages). The landscape used for the HRV analysis is the Lower Sheep planning area. The planning area size (23,900 acres) meets the Forest Plan Amendment direction to analyze an area of 15,000-35,000 acres. The Historic Range of Variability analysis includes only national forest lands. The analysis is based on "The Potential Natural Vegetation of the Umatilla National Forest" (Dave Powell, June 1998), by direction from the Forest Supervisor, Jeff Blackwood, in a memo titled "Historical Percentages for Use with HRV Analyses" (December 11, 1998).

The following table shows the comparisons of current stand structure conditions with the Historic Range of Variability for each PVG. Late Old Structure (LOS) is represented as Old Forest Single Stratum (OFSS) and Old Forest Multi Strata (OFMS).

Table G-2. Current Stand Structures Compared with the Historic Range of Variability of Forest Stand Structures on the Lower Sheep Planning Area

PVG		UPLAND FOREST STRUCTURAL STAGES **SI**	**SEOC**	**SECC**	**UR**	**YFMS**	**OFMS**	**OFSS**	Scenario **A/B**
Lower Sheep Planning Area	Cold Upland Forest Historic%	1-20	0-5	5-20	5-25	10-40	10-40	0-5	
	Current%	**0** (below)	**0** (within)	**0** (below)	**0** (below)	**12** (within)	**26** (within)	**62** (above)	**B**
	Moist Upland Forest Historic%	1-10	0-5	5-25	5-25	40-60	10-30	0-5	
	Current%	**18** (above)	**32** (above)	**4** (below)	**2** (below)	**14** (below)	**13** (within)	**18** (above)	**B**
	Dry Upland Forest Historic%	5-15	5-20	1-10	1-10	5-25	5-20	15-55	
	Current%	**2** (below)	**21** (above)	**30** (above)	**3** (within)	**5** (within)	**26** (above)	**14** (below)	**A**

Wildlife Standards

In Cold Upland Forest, OFMS is within HRV and OFSS is substantially above HRV. That puts the PVG into Scenario B. There are only 148 acres, less than 1 percent of the planning area, of Cold Upland Forest. There is no harvest proposed in Cold Upland Forest.

In Moist Upland Forest, OFMS is within HRV and OFSS is above HRV. That puts the PVG into "Scenario B".

In Dry Upland Forest, OFMS is above HRV but OFSS is slightly below HRV. That puts the PVG into "Scenario A".

The following table shows the comparisons of current stand structure conditions with the Historic Range of Variability, using the LOS abbreviations found in Forest Plan Amendment 11. The stand structure codes we use are equivalent, i.e. OFSS is the same as SSLT, OFMS is the same as MSLT.

Table G-3. Comparison of Current LOS Components with Historical Ranges

Biophysical Environment	LOS Component	Historical Range (%)	Current Percent	Comparison	Forest Plan Amendment 11: Wildlife Standard Results
Cold Upland Forest	SSLT	0 – 5	62	Above HRV	Scenario B
	MSLT	10 - 40	26	Within HRV	
Moist Upland Forest	SSLT	0 – 5	18	Above HRV	Scenario B
	MSLT	10 – 30	13	Within HRV	
Dry Upland Forest	SSLT	15 – 55	14	Below HRV	Scenario A
	MSLT	5 – 20	26	Above HRV	

Dry Upland Forest, Scenario A:

OFSS is below HRV, and OFMS is above HRV. Under the Screens, if either type of LOS is below HRV, the PVG falls under Scenario A, which restricts further harvesting in LOS and harvesting of large trees in other structure types. Therefore, the treatment proposals in Dry Upland Forest PVG would be consistent with items 1 through 5 of Scenario A:

Item 1 allows timber sale activities within late/old structure (LOS) in order to maintain or enhance LOS in a particular biophysical environment.

There is no harvest proposed in Dry Upland Forest LOS.

Item 2 involves harvest outside of LOS. Remnant late and old seral and/or structural live trees greater than or equal to 21 inches in diameter must be maintained. Manipulation of vegetative structure not meeting LOS standards should occur in such a way that conditions are moved toward LOS structure. Maintenance or restoration of open, park-like structure should be emphasized whenever appropriate.

No live trees greater than or equal to 21 inches dbh would be removed. Harvest treatments (thinning and small group selections) would increase growth rates, thereby producing future large trees more quickly than would occurr without thinning.

Item 3 involves maintenance of connectivity between LOS stands, and reducing fragmentation of existing LOS stands. LOS stands in the planning area are connected in a network pattern by at least two directions, and with the best stands available (medium or larger trees common, canopy closures within top one-third of site potential, and stand widths at least 400 feet). Where these conditions did not exist, the next best stands were used.

Harvesting within connectivity corridors is permitted as long as medium and large diameter trees remain common, canopy closure remains within the top one-third of the site potential, and some understory remains in patches.

Stands surrounded by LOS should not be considered for regeneration prescriptions.

All proposed prescriptions would leave fully stocked stands after harvest and connectivity of LOS stands would be maintained (Wildlife Report). The 400-foot minimum width would be maintained. The thinning and selection harvest would increase growth rates, thereby producing future large trees more quickly than would occur without thinning.

Three stands in connective habitat would have small amounts (10%) of group selection harvest and the remainder of the stand would be thinned.

Unit (90) is surrounded by LOS. One group of diseased trees, approximately 2 acres, is proposed for removal. This amount of group selection would have a negligible effect to the structure and function of the stand as connective habitat.

Table 4. Proposed Unit Acres and Prescriptions within Connective Habitat Corridors

Unit	Acres of Connectivity Affected	Forest PVG	Stand Structure	Prescription
3	7	Dry	UR	Commercial thinning
8	29	Moist	UR	Commercial thinning
12	29	Moist	UR	Commercial thinning
13	7	Moist	YFMS	Commercial thinning with group selection
14	20	Moist	SECC	Commercial thinning
21	5	Moist	YFMS	Commercial thinning
22	11	Moist	YFMS	Commercial thinning
29	7	Moist	YFMS	Commercial thinning with improvement cut
30	23	Moist	SECC	Commercial thinning
33	10	Moist	YFMS	Commercial thinning
40	20	Moist	YFMS	Commercial thinning
51	14	Moist	YFMS	Improvement cut with group selection
60	47	Moist	SECC	Commercial thinning
61	16	Moist	SEOC	Commercial thinning
62	25	Moist	SEOC	Commercial thinning
63	20	Moist	SEOC	Commercial thinning
64	16	Moist	SEOC	Commercial thinning
65	17	Moist	YFMS	Commercial thinning
72	3	Dry	SECC	Commercial thinning with improvement cut
73	2	Dry	SECC	Commercial thinning with improvement cut
75A	19	Dry	YFMS	Individual tree selection
75B	35	Dry	YFMS	Commercial thinning with individual tree selection
81	32	Moist	YFMS	Commercial thinning with improvement cut
90	28	Moist	UR	Commercial thinning with group selection
Total	**442**			

Item 4 involves snags, green-tree replacements, and down logs. Snags and green-tree replacements, if available, would be retained in all timber harvest units at a rate designed to meet the 100 percent potential population level of primary cavity excavators.

In the harvest units, dead trees would be harvested only if they exceed the snag requirements. Where down logs are below management requirements, down logs would not be removed in the harvest operations.

Item 5 involves goshawk habitat.

No known goshawk nests occur in the project area. If nests were discovered during project layout, 30 acres of most-suitable nesting habitat would be excluded from timber harvest around the nest site. Retain all LOS in a 400-acre post-fledging area. Enhance younger stands towards LOS condition where possible.

Moist Upland Forest, Scenario B:

OFMS is within HRV and OFSS is above HRV. That puts the PVG into "Scenario B", in which harvest within LOS is allowed as long as conditions do not fall below HRV.

Item 1 gives the priority of stand types in which harvest activities should occur, and emphasizes that harvest may occur within LOS, but preference should be given to smaller, isolated LOS stands <100 acres in size, and regeneration activities are not allowed within larger LOS stands.

All proposed treatments in LOS are in stands < 100 acres.

Item 2 directs maintaining connectivity as directed in Scenario A item 3 (connectivity).

Table 4 above applies.

Item 3 involves non-fragmentation of large LOS stands >= 100 acres. In the interior (beyond 300 ft from edge), harvest is limited to non-fragmenting prescriptions such as thinning, single-tree selection, or other non-regeneration activities. Group selection is only allowed when openings created either mimic the natural forest pattern, and/or do not exceed one-half acre in size.

All proposed treatments in LOS are in stands < 100 acres.

Item 4 adheres to wildlife prescriptions provided in Scenario A, Item 4, for snags and down wood habitat, and Item 5 for goshawk habitat with the following exception: maintain 60 percent of the 400 acre post fledging area in an LOS condition.

In the harvest units, dead trees would be harvested only if they exceed the snag requirements. Where down logs are below management requirements, down logs would not be removed in the harvest operations.

No known goshawk nests occur in the project area.

Appendix H –Soil Resource Inventory

Soil Resource Inventory (SRI) Listings by Acres for Alternative B

Units	Acres	Entries	Year	Puddling	Erosion	Natural Stability	Compaction	Ash Soils
3	25.15	0		L	H	S	L	Ash
					M	US	H	
8	29.28	0		M	M	S	M	Ash
12	29.28	0		M	M	S	M	Ash
13	14.65	0			H		L	Ash
				M		S	H	
14	38.87	0		M	M	S	M	Ash
15	24.29	1	80	H	H	S	M	Ash
				M	M		H	
17	52.07	1	80	M	H	S	N	Ash
18	3.82	0		M	H	S	H	Ash
19	9.04	0		M	M	S	M	Ash
20	32.87	0		M	H	S	H	Ash
21	5.47	0		H		S		Non-Ash
					M		M	
22	10.83	0		M	H	S	H	Ash
23	16.48	0		H	M	MS		Non-Ash
							H	
24	21.14	0		M	H	S	M	Ash
					M		H	
27	9.39	0		M	H	S	H	Ash
29	14.82	1	84	M	M	S	M	Ash
30	46.82	0		L	H	MS	L	Ash
31	10.73	0		L	H	MS	L	Ash
32	21.03	0			H			Ash
				M		S	H	
33	20.75	0		M	H	S	H	Ash
35	18.22	0		H	M	MS	H	Ash
38	10.29	0		L	H	MS	L	Ash
39	6.43	0		H		MS		Ash
					M		H	
40	29.16	0		H	M	MS	H	Ash
43	73.32	1	76	H	M	MS	H	Ash
45	111.53	0		H	M	S	M	Ash
46	10.64	1	76	H	M	S	M	Ash
47	49.94	1	76	H	M	S	M	Ash
48	2.88	0		H	M	MS	H	Ash
49	8.18	0		H	M	S	M	Ash
50	29.83	0		H	M	S	M	Ash
51	30.06	0		H	M	MS	H	Ash
58	39.97	0		M	M	S	H	Ash
60	95.44	0		H	M	MS		Ash

Units	Acres	Entries	Year	Puddling	Erosion	Natural Stability	Compaction	Ash Soils
				M		S		
							H	
61	64.24	0		M	M	S	H	Ash
62	25.18	0		H	M	MS	M	Ash
							H	
63	83.27	0		H	M	MS		Ash
							H	
64	46.89	0		H	M	S	H	Ash
65	51.62	0		H	M	MS	H	Ash
						S		
66	37.16	0		H	M		H	Ash
						S		
67	94.94	0		H	M	S		Ash
							H	
69	9.64	0		L	H	MS	H	Ash
72	2.83	0		H	M	MS	H	Ash
73	10.67	0		L	H	MS	L	Ash
74	37.30	0		H	M	MS	M	Ash
						S	H	
75a	18.55	0		H	M	S	L	Ash
75b	71.46	0		H	M	S	M	Ash
78	10.19	0		L	H	MS	L	Ash
79	26.06	1	79	H	M		H	Ash
80	65.21	0		H	M		H	Ash
						S		
81	31.75	1	84	H	M		M	Ash
						S		
84	13.32	0		M	M	S	H	Ash
85	54.78	0			H	S	M	Ash
				M			H	
86	11.27	2	80/83	H	H	S	H	Ash
89	19.51	0		M			H	Ash
					M	S		
90	54.36	0		H	M	MS	M	Ash
							H	
						U		
110	21.07	1	79		M	S	H	Ash
				M				

Appendix I – Habitat Effectiveness Index Calculations

The Habitat Effectiveness Index (HEI) (Thomas et al. 1988) was calculated using the Umatilla National Forest EVG database to assign cover values. Polygons were then converted to ASCII files and loaded into HEICalc software version 2.1 (Hitchcock and Ager 1992). Recent aerial photos (2001) were used to double-check some areas. Decisions concerning the suitability of these habitats and their potential for meeting Forest Plan standards and guidelines were made based on the expertise of wildlife biologists and ID team members.

Dedicated Old Growth (C1) and riparian areas (C5) were included where surrounded by C4 or E2. Due to the awkward spatial arrangement of management areas, and the potential unintentional effects on the model, C4 was analyzed as two distinct areas and then added together in the final spreadsheet.

Satisfactory and marginal cover percentages were calculated by dividing the number of acres of each cover type in the management area by the total number of acres in the management area that could potentially provide cover. The following criteria was used to assign elk cover values to polygons in the EVG database:

Management Area C4

	Tree Cov	Cover Type	Structural Stage
Satisfactory	≥ 70%	ALL	SECC, YFMS, OFMS, OFSS
Marginal	≥ 40%	ALL	SEOC, SECC, YFMS, OFMS, OFSS, UR

Management Area E2

	Tree Cov	Cover Type	Structural Stage
Satisfactory	≥ 70%	ABLA2, PIEN, PICO, ABGR, PSME, Mix-Conifer, PIPO MIX	SECC, YFMS, OFMS, OFSS
Satisfactory	≥ 50%	PIPO	SECC, YFMS, OFMS, OFSS
Marginal	≥ 40%	ALL	SEOC, SECC, YFMS, OFMS, OFSS, UR

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